THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

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Aug. 16, 1859.

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FOR

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Tubes of all kinds, with or without Flush Joints, for Artesian Wells, and general Boring Stocks, Taps, and Dies, Boiler-Fittings, Brass Cocks, &c.

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PATENT DRY GAS-METER MANUFACTURER,

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ALLEN STREET, GOSWELL STREET, E.C.
Established 1844.

LORD REDESDALE'S "SALE OF GAS BILL."

LONDON, August 15, 1859.

THOMAS GLOVER takes the earliest opportunity of intimating to Gas Companies and his other Customers that, as Lord Redesdale's "Sale of Gas Bill" has determined the unit of measurement, he is now prepared to supply his Patent Dry Gas-Meters guaranteed to meet all the legal requirements of that bill.

THOMAS GLOVER confines his sole attention to the business of Gas-Meter Making. The propriety of his doing so is satisfactorily proved by his success; and, without the practice of any quackery, or any attempt to delude the public by an absurd exhibition of "Old and New Valves," his Meters are in general use by the Metropolitan Gas and other Companies in this Country and abroad. For example, one Metropolitan Company have now in use above **12,500** of his Patent Dry Gas-Meters; some of these Meters have been fixed for Fourteen Years, and are still in working order, without complaint from either the Company or the Consumer.

THOMAS GLOVER thinks it necessary to put Gas Companies on their guard against parties selling Patent Dry Gas-Meters constructed in imitation of his, but unskilfully made on erroneous principles, and with improper and unsuitable materials.

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and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variabl

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GAS-METER MANUFACTURERS,

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C. and Co. are the only house in the trade which has for years manufactured Meters according to the standard measure set forth in the 2nd Section of the "Sale of Gas Act," and which also comply with the rules laid down in the Section for testing meters. Purchasers of C. and Co.'s Meters may therefore be secured against any additional expenses being incurred in order to adapt their Meters to the requirements of the new Act.

JOURNAL OF GAS LIGHTING
NEWSPAPER

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TO CORRESPONDENTS.

An Old Subscriber.—*We apprehend that a shareholder in a gas company is a "seller of gas" within the meaning of Lord Redesdale's Act, and is consequently ineligible for the office of inspector of meters under that Act.*

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

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THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 13, 1859.

NOTES UPON PASSING EVENTS.

Immediately before the close of the last Session of Parliament, Mr. Tite gave notice of his intention to move for leave to introduce, in the course of the next Session, "A Bill to Amend the Metropolis Local Management Act." To the public at large, little has transpired with respect to the nature of the intended measure; and as hitherto the taxpayers of the Metropolis have treated the Board of Works with marked indifference and neglect, the notice we have referred to has fallen upon dull ears. Yet the interests entrusted to the Metropolitan Board are mighty and vital enough, so to speak, to call for greater attention from its constituents; and it does seem to be a legitimate subject for regret, that the introduction of any scheme for amending this boasted triumph of Whig legislation should not be taken advantage of for the purpose of correcting some of its most glaring defects, both theoretical and practical. It would be an endless task to point out the latter; but with respect to the former, there is one so marked, and of such serious importance, that we step out of our way to allude to it.

The gravest defect in the Metropolis Local Management Act consists, we believe, and have often before said, in the fact that there is no direct responsibility on the part of its President to the electoral body, and that there is very little responsibility on the part of the ordinary members of the Board themselves. Like all admirers of Administrative Centralization, Lord Llanover evidently dreaded the frequent intervention of the electors, and their direct action upon the proceedings of the men who were supposed to represent them; and perhaps his own connexion with the St. Pancras Vestry had not been of a nature to increase his love for the principles of pure democracy. But however that be, he has certainly devised a scheme by which all the old-fashioned English notions with respect to the election of parochial and municipal officers were at once ignored; and the delusive theories of the philosophers of the French National Convention, in an awkward travesty, were substituted for them. At present the ratepayers name (with more or less trickery, under the delusive "voting-paper" system) the members of the vestries; the latter, in their turn, name the members of the Metropolitan Board, who are only subject to re-election at the expiration of three years, whilst the President, once elected, is virtually elected for life. Now, we contend that such a system is a complete mockery of popular election; and that were it not for the power of public opinion, and the sterling honesty of the bulk of our countrymen, it is one which might easily be perverted into an organ of despotism. There can be no more reason why the Members of the Metropolitan Board of Works should not be compelled to offer themselves directly to the ratepayers for annual re-election, than there was for dispensing the Common Councillors of London with such a duty. Our ancestors, however, as Mr. Toulmin Smith often remarks, understood the true spirit of Representative Institutions better than the constitution-mongers of modern times. Be this as it may, now that there is an opportunity of undoing some of the mischief done by the Whigs in this particular instance, it is to be hoped that it will be seized, and that the Bill for amending the Metropolis Local Management Act will be made to include some provision for restoring the virtual and direct responsibility of the Members of the Board of Works.

We observe that some of the Journals which follow in the wake of the Registrar-General, and of the self-constituted scientific authorities of the day, have lately presumed to throw the responsibility of the mortality they are pleased to call "unnatural" upon the various municipal institutions of the country, and upon "the eminent Engineers in whom they put their trust." Amongst thinking people, the abuse of such parties would of course be an honour; but as the bulk of mankind yield a species of blind deference to the opinions uttered "by authority," it may be necessary to observe that the so-called Sanitary Reformers, "assisted by the Engineers who were *not* eminent," but in whom they put *their* trust, have already been tried, and proved to have been even more wanting than any of the Boards they now find it a good speculation to abuse. Far be it from us to say that Local Boards of Health are immaculate, or that the Metropolitan Board of Works has done all that might fairly have been expected of it. Indeed, we believe that those bodies may be charged with many errors of omission and commission; but it is certain that they have done good almost in the direct ratio of their freedom of administrative interference; and that the sanitary theories of the Registrar-General, and of his "obscure" Engineers, would soon cause the rates of mortality, now said to be enormous, to rise, as they always have done when those theories have been applied. "The time has been that when the brains were out the man would die;" but now this law seems to be rescinded; for although the absurdity of the doctrines of the Sanitary school, the nonsense of the so-called natural rate of mortality, the utter inanity of the schemes proposed for the "utilization of British guano," and the numerous other follies of official science have been again and again exposed, the authors of the mischievous system with which they are connected are still allowed to repeat, at the expense of the nation, their own theories, and their abuse of the parties who have been compelled to expose and resist the application of their crotchets.

It is wearisome to be obliged so often to return to this subject, but at the present day the spread of Administrative Centralization is so rapid, and its consequences have been in many cases so fatal, that at whatever risk it becomes our duty to protest against the system itself. There has lately been furnished a striking illustration of one practical result of this system, as carried out by our French neighbours, to which it may just now be especially important to allude, insomuch as it affords a strong proof that paternal governments are not those under which life is the most carefully and jealously guarded. The fact to which we refer is that the rate of mortality in France, between the ages of twenty and twenty-five, is amongst men markedly greater than that of the population between the ages of twenty-five and thirty, whereas the contrary proportion would naturally prevail if the State did not disturb the normal laws of mortality. It seems that the increase in the death rate

in this particular case is, in some way or other, to be attributed to the conscription; for the same law prevails with respect to the mortality of Belgium, Holland, and Prussia, as of France; but not with respect to that of either Sweden or England, wherein no compulsory military service exists. It would be a curious subject for study to compare the actual results of the various systems of Government as exemplified by the death rates in the various countries, and it is more than probable that the conclusion to be drawn from such an investigation would be that the "laissez passer, laissez faire" system is after all the most successful and the most reasonable.

One of the most serious constitutional questions which has been raised of late years is the one connected with the reprieve of Dr. Smethurst; and it is to be hoped that this extraordinary case will not be allowed to rest in the very unsatisfactory state in which it is at present. The Home Secretary, in the discharge of his duty, has, in fact, felt it to be incumbent upon him to set aside the judgment passed upon the prisoner, and virtually to overrule the verdict of the jury. Now we would not seek to interfere with the exercise of the prerogative of the Crown; and indeed, being decidedly opposed to capital punishment, *under any circumstances whatever*, we cannot but approve of the determination not to allow the extreme rigour of the law to be applied in this instance. But we do most decidedly object to the existence of the power, in the hands of *any* individual, to overrule the decisions of a competent tribunal, without public or contradictory debate. An appeal in criminal cases may be, and we think that it would be, desirable; especially when the Judge was so prejudiced and so unfair, as the Lord Chief Baron was in the trial of Dr. Smethurst; but if the law leave the responsibility of the decision of a case with the Jury, and the appreciation of the sentence with the Judge, it does seem the height of absurdity to leave in the hands of another man, who neither saw the witnesses, nor heard the evidence, the power of stultifying the proceedings of the tribunal provided by the Constitution. The point we raise is, in fact, whether or not it be desirable that any individual should be able, according to his own discretion, to set aside the decisions of a properly-constituted tribunal. If the present system be retained, the time and the trouble of the Jury might as well be saved, and all the useless paraphœnalia of inquest, magistrates' examination, and trial, set aside. We hope that a careful examination of the whole question of criminal trials will take place in consequence of the logical absurdities which have thus followed from the actual state of the law; for it is monstrous that an appeal should exist in civil cases, and that an action at law should be able to be carried from court to court if there be any shawdow of pretence; and yet that, when a man's life and liberty are at stake, the only appeal should lie from the Jury to a private individual, who examines the portion of evidence brought before him in his own study, and without the assistance of any controlling opinion.

There seems at last to be some probability of a conclusion of the Builders' strike, though the very questionable proceeding of the Masters in still exacting the Declaration will, it is to be feared, maintain for some time longer the irritation which has been produced by the lock-out. Both parties to this unfortunate dispute appear to us to have been in the wrong; but the Masters, as the better informed, are perhaps the most to blame for their want of the spirit of kindness and conciliation which ought to prevail in such cases. Nevertheless, the conduct of the Society leaders has been so often marked by an insolent, ignorant, desire to interfere with the liberty of action both of masters and of their fellow-workmen, that some open war against Trade Societies had become inevitable. Most sincerely do we hope that a few days will now restore business to its usual current; and most earnestly do we wish to see Messrs. Porter and Co. subside into the insignificance which they ought never to have emerged from. One of the worst consequences of these movements is, that they are never isolated, and the London strike, as we had occasion to notice, has not only been accompanied by the various strikes in the collieries, but latterly it has been accompanied by a similar proceeding on the part of the shipwrights of the Tyne. The latter workmen have obtained 5s. per day, and for the present seem to have been successful; but we beg to remind them that ship-building can be, and is, executed far more cheaply, and quite as well, in such places as Rotterdam, Amsterdam, Havre, Granville, Bordeaux, &c., as at Newcastle or Sunderland. A few more such victories may ruin the Tyne workmen altogether, and they would do well to reflect on all the bearings of their conduct.

A more satisfactory movement than the one connected with the strikes seems to be gathering strength in the North, viz., the one for the establishment of a Mining and Engineering College at Durham. Such an institution, if it keep clear of Government influence and patronage, must do good, and with that hope, we wish the authors of the scheme "good speed." A similar college, perhaps, ought to be founded in Cornwall, or in the West of England.

The accident which recently happened to the Birmingham Canal at Dudley port, when the bed of the canal was carried away, in consequence of some injudicious excavations beneath it, seems to illustrate the necessity for either a more stringent supervision of the underground mining operations, or for a better education of the parties connected with them. It may, however, be suspected that the latter is the true solution of the question thus raised; because, from some recent publications, it may be inferred that professional education is at rather a low ebb—amongst those, at least, who command public attention. Thus, the Oldham people seem, from the document we reprint elsewhere, to have based their projected water supplies upon *average* rainfalls and *average* atmospheric conditions, forgetting that, for the last three years consecutively, the rainfall in England has been below the average, whilst by the same rule the evaporation must have been proportionally greater, and the necessity for a copious water supply increased. Again, the chemical advisers of the Metropolitan Board of Works suggest that it may only be necessary to disinfect the sewerage for three months in the course of the year; but it is notorious that the Thames has been in its present repulsive state ever since the middle of April, or about six months in the course of this year. As to the distance of the point of outfall, we repeat that it has very little to do with the matter, for if placed anywhere on the west of the meeting of the two tidal waves of the Thames, anything, whether solid or fluid, cast into the River must be carried inland. It is strange to find eminent men making such mistakes, or endeavouring "to make things comfortable." The public must pay, at last, for all indispensable works, and surely it is more honourable to tell at once the whole truth with respect to them.

With the exception of some very unseemly correspondence between Sir C. Barry and Mr. Dennison about the Westminster clock, in which the latter individual has proved himself to be a perfect master of the *vulgar* tongue, even if he have displayed very little knowledge of the business he pretends to legislate upon; and the announcement by the Madras Canal and Irrigation Company that their plans have been completed—and consigned to the limbo of red tape; very little has been done of late in the Engineering world of England beyond the final departure of the *Great Eastern* from her "bower of roses." The sad accident this vessel has met with must be a universal source of regret; but it certainly tells wonders for the strength of the framework of this noble specimen of ship-building. No other vessel could have resisted such a mighty strain as must have been produced by the explosion. In all other respects the trial trip seems to have been perfectly successful.

On the Continent, the most amusing piece of Engineering news is the manifesto of M. de Lesseps against "*la perfide Albion*," which we are sorry to see that Mr. Lange has reproduced here. It seems that we are to be inflicted with "battle, and murder, and sudden deaths," because the Pacha of Egypt and the Sultan are at cross purposes with respect to that most ridiculous (in a commercial point of view) scheme. Really this reminds us of the exclamation of the Jew who was interrupted in his meal of pork by a storm of thunder and lightning—it would be a mighty fuss about a very small matter. M. de Lesseps may depend on it that the English public regard his proceedings with far too little faith in their success, or even in his own conviction of the solidity of the enterprise he has embarked in, to trouble themselves about the ultimate results of his operations. If it be any consolation to him, he may depend on it that we will "let him have rope," knowing that if we do so, the usual consequences will follow.

One of M. de Lesseps' colleagues, M. Conrad, of the Dutch Waterstaat, has recently published a Report on the project for connecting Amsterdam with the sea, by means of a canal through the Isthmus of North Holland. M. Conrad's scheme seems to us to be exposed to the very same serious practical objection as M. de Lesseps' Suez Canal—viz., that one of the outlets, being situated immediately athwart the line of the flood-tide, must inevitably be silted up. On some future occasion we may return to the whole of this question; but we

are anxious now to direct attention to the fact that the Dutch Waterstaat, acting in the true spirit of a Centralized Administration, has thought proper to suggest a scheme of its own for effecting an object it had long declared chimerical, when it found that an influential body of private capitalists was prepared to do what it had so long affected to despise. Truly the Waterstaat may well apply to itself the fable of the Dog in the Manger. Our remarks, however, must in no wise be considered as approbatory of either of these schemes.

ON THE PROPOSED SUPPLY OF THE SERPENTINE FROM DUCK ISLAND.

In our last article on the state of the Serpentine, we stated, in terms which perhaps were hardly clear enough, that the question of the choice of the system to be adopted for the purification of its waters must entirely depend upon the quantity of water required to be renewed daily (on the average of the year); and we stated also that, in our opinion, it would be impossible to supply water from the well in Duck Island at a price lower than that at which it could be supplied by either of the great Water Companies whose mains skirt the northern side of Kensington Gardens. Upon reflection, we still adhere to those opinions, merely observing that, with regard to the former, the decision must rest entirely upon Mr. Hawksley's experience and authority. We think, with him, that it would be a perfectly unjustifiable waste of public money to attempt to remove the mud from the bed of the Serpentine; but we differ from him in our estimate of the quantity of fresh water required to be introduced in order to maintain the comparative purity of the river. In fact, we think that the necessary quantity might be obtained from the Water Companies at the price these new works are likely to cost in the shape of interest, working expenses, and repairs; but, as we said before, we waive our own opinion in deference to the superior knowledge of Mr. Hawksley, who distinctly asserts that it is necessary to introduce about six times the quantity of water we believe to be attainable at the cost of the system he proposes. *Magister dixit;* the disciples must hold their peace. The money question, this being granted, disposes of this part of the discussion; but there are some technical details connected with the Duck Island project which seem to us to merit a more serious investigation than they have hitherto received, notwithstanding the hard words exchanged with respect to them by Sir M. Peto and Messrs. Easton and Amos.

In the first place, it seems to us evident that any water derived from a sand-bed receiving its supply by filtration from the Thames, and necessarily exposed to be contaminated by the percolations from the sewers, and the innumerable cesspools of Belgravia, and the low-lying districts of Westminster, must be, *ex necessitate rei*, of the most impure description. It is, indeed, to be observed, that although many analyses of the waters formerly existing in St. James's Park have been ostentatiously paraded, very little has been said of the composition of those now supplied. Yet within a very short period the basins in this Park have been covered with an amount of confervœ, or of organic matter, which has been far in excess of that observed in the Serpentine at the very worst periods; and they have been almost as foul as the dumb waiters in Trafalgar Square occasionally become. The very operation of making this artificial lake shallow, and of lining it with concrete, has only tended to favour the growth of the peculiar vegetation observed in it; because the shallowness of the water allows the temperature of the mass to be more easily raised, and the free access of light and heat are known to be amongst the most favourable conditions of the growth of fresh water algœ; whilst the large quantities of free lime, taken up from the very bad concrete employed in lining the basins, furnish a powerful aliment to the plants. If, therefore, water were taken from Duck Island to supply the Serpentine, it seems to us that the quantity assumed by Mr. Hawksley, to require renewal every day, must be the very least to be taken from this source. A water so charged with organic matter as the Duck Island water must be, can only, in fact, be kept clear by being maintained in a state of perpetual motion, or by being frequently made the subject of costly cleansing operations.

Messrs. Easton and Amos, with considerable acrimony, contradicted Sir M. Peto's assertion that the waters in St. James's Park filtered through the concrete bed, to be pumped over again into the lake; and they cited, as a proof to the contrary, that the water in the well stood at a lower level than that of the water in the lake. But Messrs. Easton and Amos must know that this observation by no means settles the precise question thus raised. It is more than possible for the water filtering through the concrete into the well to meet with such an amount of resistance in its passage, that it could only attain the same level in the latter which it attained in the former, after the lapse of a very considerable time. The area of filtering surface is large; that of the well very small; and it is not reasonable to expect that the balance, so to speak, of the water lines should adjust itself immediately, under the peculiar circumstances of the case. The real way of ascertaining whether or no the concrete bed holds water perfectly would be to gauge the quantity pumped in, and to deduct from it the quantities attributable to evaporation and to soaking into the banks. The water levels prove little or nothing, as Messrs. Easton and Amos very well know.

For the sake of the public generally, we dwell upon this subject of the use of concrete linings to artificial collections of water, because we observe that some of our Canal Companies have very tardily imitated the practice of our French neighbours in this matter. Hitherto the method adopted to secure the impermeability of the canal or reservoir beds has been to line them with puddle of considerable thickness; but puddle, however well made originally, is liable to shrink and to crack, if exposed to the action of the atmosphere; and at all times it is only partially impermeable, especially if the subsoil be exposed to move, whilst it is easily traversed by moles, rats, or other burrowing animals. Many years since, the Engineers of the Canal de St. Quintin had found, indeed, that in certain positions it was impossible to keep the bed water-tight by the use of puddle, and they therefore substituted for it a lining of hydraulic concrete of 8 inches in thickness. The success of a concrete lining depends, however, even more than does that of a puddle one, upon the skill with which the lining is made, and the nature of the lime used is also a very important condition; but even when all imaginable care has been taken, it must be utterly impossible to execute so large a surface as that of the artificial lake in St. James's Park without fissures or cracks through which water would find its way. In the course of executing the works in St. James's Park, we ourselves had occasion to observe that very little pains indeed were taken with the manipulation of the concrete. The lime was slacked upon the ballast; the heap was turned over once or twice, until the labourers entrusted with the work thought it was properly mixed; there were no measures used to ascertain the relative proportions of the ingredients, and, consequently, there is not the slightest probability that the concrete bed can be impermeable. Within the range of ordinary atmospheric influence, the concrete of the St. James's Park basin certainly has given way, and though in the lower portions it is possible that the gradual operation of the laws of chemical affinity may have superinduced the effect of what is called "water binding" the respective ingredients, yet it is just as likely that the constant renewal of the water may simply have removed the more soluble salts of lime, which were left uncombined during the very slipshod operation of making the concrete as here practised. In England, generally, engineers are very careless about the use of lime, forgetting that its successful application is, after all, a chemical operation carried on upon an extensive scale; but we hardly ever recollect to have seen a large body of concrete, intended for so peculiar a situation, moreover, made with so little skill or science as was the concrete of St. James's Park. Until, then, the impermeability of this lining has been demonstrated by the class of experiment we have alluded to, we must beg to pin our faith rather on the observations of Sir M. Peto with respect to it, than on the contradictions hitherto given to him. Even should the basin be comparatively speaking impermeable, it would be so "more by good luck than by good management."

The bathers of the Serpentine, who ought to know something about the state of that pool, protest, and we think very wisely, against the uniform shallowing of the waters of their favourite resort. In the case of the St. James's Park, as was before said, we have recently been able to observe one practical inconvenience attending such a course of proceeding; and, with the Serpentine waters, which seem particularly favourable to the growth of confervœ and algœ, the danger from the rapid growth of that class of vegetation would be considerably greater. Whatever may be the quantity of fresh or of filtered water pumped into the Serpentine per day, it must still remain to some extent stagnant; and it is notorious that the deeper pools of stagnant waters are, the purer they are likely to remain.

It is to be hoped, therefore, that the grossly exaggerated alarm about the number of deaths in the Serpentine will not be allowed to influence the decisions of the Board of Works with respect to the depth hereafter to be given to that artificial reservoir,—and also that, whatever other system be adopted for purifying its waters, the Duck Island well will not be resorted to.

Circular to Gas Companies.

Mr. Laming, the original discoverer of the revivification of oxide of iron by exposure to the air—which discovery gave practical value to the oxide of iron process of purification—has recently ascertained that there is an oxide of manganese that may be revived with great facility after having been used in the purifiers, and which possesses many advantages superior to those of oxide of iron. It is known that many metallic oxides in certain states possess the power of purifying gas from sulphuretted hydrogen. The oxides of manganese, of zinc, lead, copper, and of antimony, have been so applied, as well as the oxide of iron, though the last one alone has been extensively used for the purpose, on account of the property it possesses of being quickly revived by absorbing oxygen from the atmosphere, which has given it much greater value commercially than any other. The oxide of manganese, as found native, whether hydrous or anhydrous, will not suit the purpose of gas purification, and has consequently been long since abandoned as useless for practical application. Nor is the hydrated protoxide of manganese, which is obtainable by precipitation, of much use in purification in the state in which it is deposited, though it may be rendered extremely serviceable by subjecting it to a subsequent oxidization—and it is in the discovery of this fact that the value of Mr. Laming's new process consists.

The hydrated protoxide of manganese is the only one of its oxides that can, except as a laboratory experiment, exist in solution, so that necessarily it is the only one that can, for commercial purposes, be precipitated from solution. The precipitated protoxide, however, elects to combine with carbonic acid in preference to sulphuretted hydrogen, and it becomes, when exposed in the purifying vessels, a *carbonate* rather than a *sulphuret* of manganese. But carbonate of the protoxide of manganese, unlike the carbonate of the protoxide of iron, is neither acted on by the sulphuretted hydrogen in impure gas nor by the oxygen of the atmosphere; consequently, the application of the protoxide of manganese to the purification of gas from sulphuretted hydrogen is, in the first instance, of very limited utility; while the subsequent application of the material after being used is, on account of its non-revivification, still less useful. The affinities of carbonic acid and sulphuretted hydrogen for manganese are, however, reversed when the precipitated protoxide is converted into a higher oxide by combining with an additional 50 or more per cent. of oxygen—an addition which may be easily made by exposing it in a disintegrated state to the air, especially in a warm atmosphere, after having been washed from the saline matter that adheres to it in the process of manufacture. The same addition of oxygen may be made more readily by dissolving chlorine in the solution of protoxide of manganese, or by combining the chlorine with the reagent by which the precipitation is to be effected. The resulting oxidized protoxide, when well prepared, is of a dark brown colour, and for convenient use it requires to be only reduced to powder and mixed with about its own measure of wetted sawdust. When placed in the purifiers it is found to absorb sulphuretted hydrogen very rapidly, and frees the gas from that impurity in a very satisfactory manner. The oxide is converted by the action of the impure gas into hydrated sulphuret of manganese, which is an innocuous substance, and speedily changes when exposed to the air, either in or out of the purifiers, into a revivifiable brown oxide that may be repeatedly used.

The revivifiable oxide of manganese may be prepared also by first precipitating the metal from its solution as a *hydrated sulphuret*, and subsequently oxidizing it by exposure to the air. The oxide obtained in that way, or by precipitation as a hydrated protoxide, or by decomposing the precipitated carbonate of manganese into the protoxide, and then in either case converting that protoxide into a higher one, appears to be the only oxide that is susceptible of being spontaneously reproduced, and accordingly available for metallic oxide purification. As might have been anticipated from the known energetic affinities of manganese, compared with those of iron, the manganese oxide has been found capable of acting more quickly than the latter, therefore smaller purifiers are requisite than when oxide of iron is employed; or, in other words, the same sized vessels will purify a larger quantity of gas. From experiments made by Mr. Laming, it appears that one dry purifier 20 feet square at work will be sufficient, when the production of gas is 1,500,000 cubic feet per diem. The oxide is mixed with an equal quantity of sawdust, or other porous inert substance, and the same purifier, when charged with a couple of 2-feet beds of the purifying material placed one above the other, will not, it is stated, require revivification until 8,000,000 cubic feet have been purified. The mixture of the oxide of manganese with sawdust is not absolutely necessary, and if used without that addition of inert matter, the effects would be increased nearly in proportion to the increased quantity of acting purifying material. It is mentioned as one of the advantages attending the use of oxide of manganese, that it is originally attainable, without admixture of valueless earthy matter, from the waste of large chemical factories; whereas the only source of available oxide of iron is a decomposition of solution of copperas (sulphate of iron), whereby the oxide contains an admixture of about 200 per cent. of useless sulphate of lime, which increases the cost of carriage and occupies much space uselessly in the purifiers.

The new process admits of being combined with an arrangement for depriving the gas of carbonic acid and ammonia before it arrives at the purifiers that contain the oxide; by which means Mr. Laming expects to remove the carbonic acid and the ammonia at little or no cost, and to secure the full commercial value of the latter, while at the same time he will incidentally improve the working of the oxide of manganese.

We are enabled to state that the oxide of manganese, as prepared by Mr. Laming, has been recently tried in two purifiers at one of the metropolitan gas-works with excellent results.

A correspondent directs attention to an apparent contradiction between the observations made in our last impression with respect to "The Sale of Gas Act," and the provisions of the 20th section of the Act itself, for which at first sight there appears to be some foundation; but when that section is read in connexion with the 18th, we apprehend no reasonable doubt can be entertained that our interpretation is substantially correct. The last-named section enacts that "every purchaser and seller of gas by meter may, at his own expense, at any time after the expiration of the said twelve months, require any unstamped meter by which his gas is measured to be examined, tested, and, if found correct, stamped, or he may at his own expense substitute a stamped meter in the place of any such unstamped meter." Section 20 provides a remedy in cases where the person in whose custody the meter is shall refuse to give up possession of it for the purposes mentioned in the above-quoted extract. It is clear that without some such summary power of entry, the consumer upon whose premises the meter is fixed could set the seller of the gas at defiance for ten years to come, in spite of the provisions of the 18th section; and the discretionary powers vested in the justices by the 20th section, first as to whether they shall grant an authority to enter, and next as to who shall pay the costs, prove that this section is not to be read by itself, but that it is a penal section, the sole object of which is to enforce obedience to the other provisions of the Act.

Correspondence.

THE LEAKAGE AND FUEL ACCOUNTS OF THE PHŒNIX GAS COMPANY.

Sir,—On reading the report in your last number of the proceedings at the half-yearly meeting of the Phœnix Gas Company, I was astonished to find that their leakage was reduced so low, and to such a nicety, as "7⅜ per cent.," and that their fuel account had been reduced to "15½ per cent." May I, therefore, request you to allow me to ask our friend Innes, through your Journal, how this is accomplished, for I must confess I have been unable to reduce my leakage much below 20 per cent., yet I manage to get at least 15 per cent. more rental than the Phœnix Company for every 20s. expended in coals; nor would I undertake to say that my fuel account is much less than 20 to 25 per cent.; but for all that, my products yield 5 per cent. more in money than theirs.

As this question of leakage is constantly arising among "ourselves," as well as at the several meetings of proprietors, would it not be better and more consistent with our characters as "engineers" to agree as to the basis from which these calculations should be

worked? Then a fair comparison might be made with the working of other companies; and when it is found that any engineer has reduced his leakage so low as "7⅛ per cent." he will well deserve the commendation of the proprietors, that he has bestowed "considerable care and attention" in the working of the concern; but while there is so much discrepancy among us as to the quantity of gas made per ton and the consumption by the public lights, it is a sheer waste of time to make any comparison whatever, or to name any figure below 25 per cent. as the loss from leakage, except as an approximate one.

I enclose my card, but if you think fit to publish this, it must be under the initials of

A. B. C.

London, Sept. 6, 1859.

THE SALE OF GAS ACT.

Sir,—In the number of the Journal dated the 30th of last month (page 470), it is said that "all meters fixed before Aug. 13, 1860, are exempt from the operation" of the Sale of Gas Act till the same date in 1869. How is this statement reconcileable with the 20th section of the Act, which empowers the inspector (*at any time or immediately*) to enter premises where a meter is used, and, if necessary, remove it?—and enacts "that a meter found incorrect on the inspector's examination, shall not be used until it is in a condition to be stamped, and has been stamped?" Under what construction is the power given by this section postponed to Aug. 13, 1860? or, if it does not come into operation at once, can you point to the language fixing the time when it is to take effect? If the magistrate were applied to for his authority under the 20th section, would he be justified in refusing to give it on the ground that the meters in respect of which the application was made were exempt from the operation of the Act—they being fixed and in use at this time?

A Shareholder in a Gas Company, and Reader of the Journal.

COMPENSATING GAS-METERS.

Sir,—In the kind notice you have been pleased to take of my humble endeavours to render the gas-meter a more perfect measuring instrument, there are one or two errors I wish to correct, as I am anxious to have the subject thoroughly ventilated, so as to arrive (if possible) at the best means of obtaining a good and reliable gas-meter. In your remarks upon the subject you necessarily mention the names of two or three makers who are now manufacturing meters upon what I think I may claim as my principle—viz., maintaining the water at an uniform level by mechanical means. In the few remarks I have here to make I shall be compelled to repeat those names, but I trust my brother tradesmen will look upon them in the spirit with which they are written, and will not suppose my object is an endeavour to raise the value of my own goods by any unkindly remarks upon their several productions.

The first patentees you name are Messrs. Crosley and Goldsmith, who adopt a plan of keeping the water at a proper level by means of two bent tubes or scoops attached to a hollow axis driven from the wheel-shaft by means of a cog-wheel and pinion. From the engravings I have seen, I suppose the wheel and pinion to be of the proportions of two to one. This would be an improvement on my plan of rotating elevator if there was only one scoop, as the quantity of water discharged would be smaller, my scoop having been driven direct from the end of the shaft without the intervention of a wheel and pinion, and taking up a measure of water at every revolution of the wheel. This meter, when made as patented, possesses the fault of some of my first compensators—viz., it lifts far too much water.

The second patentee you name is the late Mr. Thomas Scholefield. In his meter there are one or two good points, the chief being the cylindrical form of case and partial division of the interior. There are, however, one or two bad features introduced, quite contrary to my advice. The first is the overflow-pipe, which is placed in such a position that a varying pressure of gas gives a varying height of water-line. The second is, placing the float under a small cover or bell, which necessitates a wide range being given to the float, enabling the meter to work at a loss of from 6 to 10 per cent. The third and most fatal objection is, that gas can be passed through the meter unmeasured, although the meter may be fixed perfectly level. There are simple remedies for each of these objectionable features, but to overcome the latter one would involve the sacrifice of one of the advantages claimed in the patent.

The third modification you name is by the late Mr. Alexander Wright, and is very nearly a copy of one of my original plans, as shown in your last Journal at fig. 2. There are, however, introduced one or two alterations, stated to be for the purpose of simplifying its action and removing the inconvenience of the sudden descent of the water-elevator. I think, however, a little reflection will show that the alteration is not an improvement, as by the new form of inclined plane or circular cam the scoop is lifted in half the time, and hence takes twice the power; and, at the same time, it cannot be used as a stop to prevent the meter from working backwards. All the before-mentioned meters vary more or less when worked at varying speeds, and, in the second and third cases, act precisely the same as common meters when the water is exhausted from the water-box.

The last meter you describe is one lately patented by myself, and the only observation I will offer upon it is, that I have endeavoured to remove the chief objections hitherto urged against compensating meters. In your closing remarks you state that the only objection to a rapid motion of the scoop is the obstruction it offers to the motion of the measuring-drum of the meter, and that if the mechanism applied for the purpose of reducing the speed offers greater resistance to motion than the elevation of the superabundant supply of water occasions, the more complicated arrangement must be accompanied by a loss of power, and that the same object would be obtained by greatly reducing the size of the scoops. I beg to say that my experiments prove to me that if the scoop is driven fast the meter will gain, and this fact has had more influence with me than the question of power; at the same time there can be no doubt that, by multiplying the power four or five hundred fold, there must be a great reduction in the amount of duty to be done by the gas in driving the meter, and although meters, when new (if properly made), may be set in motion with half a tenth pressure, it is well known that the average amount of pressure required is far greater. With reference to the size of the scoops, I beg to say they were originally made very small, and the present increased size has been brought about entirely by finding in practice that the smaller sizes when dirty did not act.

C. R. Mead.

Meter and Gas Apparatus Works, 176, *Great Dover Street, Borough, London, Sept.* 9, 1859.

Register of New Patents.

473.—George Humphrey, of Deptford, Kent, engineer, for "*Improvements in meters for measuring fluids and gases.*" Provisional protection only obtained. Dated Feb. 21, 1859.

The object of this invention is to register correctly the passage of fluids and gases. It consists of a case containing a circular plate or wheel revolving on an axis, and from which a number of fans or blades project, and travel in a race or course formed by corresponding projections in the case. The passage of the fluid or gas from the inlet to the outlet-pipe gives motion to the fans or blades of the wheel, and thence to the ordinary registering dials.

441.—Samuel Thomas Cooper, of Upper Clapton, gentleman, for "*Improvements in the use and application of artificial light.*" Patent dated Feb. 17, 1859.

This invention consists in the use and application of coal gas or any other kind of illuminating gas for signals and other purposes, by igniting and extinguishing a jet or jets of such gas on a plan or in a manner which has not hitherto been practised for such purpose, and is specially applicable for signals for railways, lighthouses, and ships at sea.

The mode of carrying out this invention is to effect the instantaneous ignition of a jet or jets of gas as they issue from a burner, by causing one or more of them to impinge upon and come in contact with a fixed flame (which may be that of gas or of an oil or other lamp) kept continuously burning; in combination with an arrangement whereby the gas intended to produce the jets as or for signals, is supplied from the gas main through a branch pipe and turned on or cut off from the burner by the action of an ordinary shut-off cock placed at any required distance from the point where the light is intended to be exhibited. This branch pipe is connected with a main from a gasometer, and fitted at one end (that next to the main) with a shut-off cock, and at the other end (close to the burner) with a spring-valve which acts at a lower pressure than that of the gas in the main. The effect of this arrangement is that when the shut-off cock is opened, the gas from the main passes through the branch pipe at a pressure which opens the spring-valve, and issues in a jet or jets from the burner, and when the shut-off cock is closed the pressure in the branch pipe is reduced until the spring-valve closes, cutting off the supply of gas to the burner but still keeping the branch pipe full of gas and excluding atmospheric air. The result of this arrangement is that when the gas is turned on from the main the jets issuing from the burner are at once ignited, and when it is turned off they are extinguished, and this twofold action is effected simply by opening or closing the shut-off cock which, as before stated, may be placed any distance required in practice from the burner of which it regulates the supply of gas.

When gas is employed for the fixed flame it is proposed to lay down two pipes for the conveyance of the gas to be used—one of a small diameter to supply the gas for the fixed flame, the other of a diameter sufficiently large to supply the gas to be used for signals, or other illuminating purposes. Or the smaller pipe may be a branch from the larger one, or an oil or other lamp may be used to produce the fixed flame, in which last-mentioned case the smaller gas-pipe and its burner would not be required.

By this arrangement the gas may be turned on or off at pleasure, and the jet or jets being so placed in contiguity with the fixed flame and with each other as to be calculated to produce the required result, any number of gas flames or any required illuminating power may be instantaneously produced and kept burning so long as the gas is turned on, and will be immediately extinguished by turning off the gas, and the operation of alternately lighting up and extinguishing these flames may be repeated at will by the simple opening or closing of the valve which regulates the supply of gas to the signal or illuminating burners.

This invention may be adopted for railway signals in the following manner. A lantern containing the burners of the fixed flame and of the signal-jets (which for distinction are called the beacon-light) is to be placed at any elevation or position to render it clearly visible from any required point or points, and may be fixed at any distance that may be desired from a railway station or other point from which the signal is intended to be worked. The shut-off cock or valve by which the gas is to be turned on or off is to be at or close to such station or working point, and provided with a handle by means of which the person in charge of the signal is to turn the gas on or off as required. By this mode of signalling, a body of

light can be displayed in a moment at a distance from the station far greater than by any kind of signal now in use, and with such brilliancy and certainty of effect that it cannot fail to be plainly visible at any point required, and will be most effective for night or fog signals.

In cases where gas is produced on board of ships, gaslight signals on the plan above described can be displayed at the mast-head or any other elevated part of the ship's masts, or on the chimney-funnel or paddle-box of a steamer. The gas-pipes in these cases would be carried up the mast, or funnel, or paddle-box, and the lantern containing the burners would be fixed at the point where the signal is intended to be displayed, whilst the regulating valve would be at some convenient place of access on the deck, or at any other part of the ship.

For lighthouses this invention can be applied in a very useful way to produce the effect of revolving lights, regulating the time of the appearance or occultation of the light with the greatest precision and simplicity, the burners of a small and of a large gas-pipe being arranged in the manner above described for a railway signal. In order to produce the illuminating effect required for a lighthouse, there might be a series of lanterns, each supplied with its permanently ignited jet of gas or other flame, and a set of signal or illuminating burners. By means of clock-work, or some other mechanical contrivance, the valve which regulates the supply of gas to these burners may be opened or closed at any required intervals of time, and the light will be visible during the time the gas is burning, and invisible (being extinguished) during the time the gas is turned off. This method of applying the invention will admit of many variations as to time in the appearance and duration of the light, and in point of precision, effect, and economy will be superior to any system of revolving lights now in use.

Lighting up and extinguishing gas jets at a distance as they issue from the burners, by contact with a small fixed flame on the plan of this invention, may be also made available for other illuminating uses, such as lighting streets, factories, theatres, and public buildings, or shops, where a great number of gaslights being used it will be convenient and economical to light them up or extinguish them simultaneously in a moment by turning the gas on or off, the use of the pressure-valve, as before described, rendering the alternate action secure and certain, whatever may be the variation of pressure in the main.

Signals on various plans are in use in different railways, but not one of them combines the requisites of a really effective night signal. That which is considered the best is a lamp with a fixed light in the centre and glass sides of different colours, shifting by the action of a wire worked round a cylinder, so as to show, when put into operation, a white or red, or other coloured light alternately, according to the position and colour of the glass. As a distant signal this lamp is placed at an elevation of 30 to 40 feet, and on a fine night is visible at a great distance to an approaching train, and also at the station it is attached to, but in a fog or hazy weather it becomes almost useless, and even with a clear atmosphere it requires a steady look-out to be seen by the driver at a sufficient distance to slacken speed or stop in time. But even this essential condition of safety, with his vision impaired or distracted by the glare of the furnace or the forward drift of the waste steam, he often finds it a difficult task to accomplish in the finest weather. The evidence taken in the inquiries into numerous cases of accident incontestibly proves that the present system of night signals leaves much to be desired, and that on occasions when they are most wanted they really afford no protection whatever.

The great value of a signal for railway purposes on the plan of this invention is, that it can be displayed so far from the station that, instead of requiring a look-out to be seen at a distance, it admits of the train being close upon it before it be necessary to stop or slacken speed. This, in foggy weather, when a signal cannot be seen at a distance, would be a great guarantee against accidents.

The following are some of the advantages of this invention:—

1. The signal can be displayed at points any required distance, from a few yards to several miles from the station or place at which it is worked. Hence, when used as a distant signal, it can be displayed so far from the station that, at the moment when it is his duty to reduce the speed of the train or stop, the driver will be close to the signal, and have it in full view, instead of having to strain his sight to see it a long way off.

2. The signal is displayed at these distant points the moment the gas is turned on at the station, and it can, if required, be repeated simultaneously at many points to the next station both ways.

3. The decisive character of the signal leaves no room for doubt, its brilliant appearance or total absence being clear and intelligible signs which cannot be misunderstood.

4. The apparatus and mechanical means employed are easy of construction, and, when established, will be so little liable to derangement or deterioration that they will last for years at a trifling expense for maintenance.

5. The management of the apparatus and the working of the signals are simple, easy, and economical, requiring no extraordinary skill to keep them in order.

6. The rapidity and certainty with which a flame can be lighted up or extinguished at a great distance from the working point admit of a code of signals being planned on the principle of varying and measuring the duration of the time of illumination and eclipse, and showing lights through glasses of different colours.

7. By a simple mechanical contrivance the gas may be turned on to or off from the signal-burners, and lighted up or extinguished by the action of a train passing over the rail as it approaches and leaves a station, or at any point on the line as it passes along.

The claims are for—

1. The principle of making signals by alternately lighting and extinguishing jets of illuminating gas.

2. The general arrangement for carrying the said principle into effect by the conveyance of gas through branch pipes from a gas main to a burner, in combination with the action of a shut-off cock and a spring valve, as described.

3. The use of a spring valve to regulate differential pressures in a gas main and its branch pipes, and preventing the entrance of atmospheric air into the branch pipes, as hereinbefore described.

4. The mode and general arrangement of making the alternating principle of igniting and extinguishing gas jets applicable to the same uses and purposes as revolving lights for lighthouses or telegraphic signals on land or at sea, as described.

5. The use of clock-work or any other mechanical means for opening and shutting a cock or valve of a pipe supplying gas to a burner, and for regulating the alternating or intermittent ignition or extinction of gas jets, as described.

6. The mode of using gas on the principles of this invention for signals on board ships.

7. The plan and general arrangement of applying the principles of the invention to enable railway trains in motion, as they pass on the rails, to cause the exhibition at given points of signal-lights for limited periods of time by means of the action of a passing train on an apparatus constructed and arranged to supply a gasholder with gas, as described.

8. The use of a permanent flame for igniting jets of gas instantaneously as they issue from a burner, as described.

539—Rev. Henry Moule, clerk, M.A., Fordington, for "*Improvements in apparatus applicable to the evaporation of sewerage or other waters, and for affording heat for other uses.*" Patent dated March 1, 1859.

This invention has for its object improvements in apparatus applicable to the evaporation of sewerage or other waters, and for affording heat for other purposes. In carrying out this invention a case of sheet metal is constructed, having at its upper part a closed cistern or vessel to contain the sewerage or other waters which are to be evaporated. This cistern or vessel is heated below by a fire in a suitable fire-place, the heat and products from such fire heating the under-surface of the cistern or vessel and then passing round the sides to a chimney at one end. The cistern or vessel is provided with a safety-valve, and from the upper part of the cistern or vessel a pipe descends into the enclosed chamber below the flue and fire-place, and by such pipe the scum, with steam, can flow into the enclosed chamber. The scum will descend into a compartment below the fire-bars and become dried, whilst the steam will pass through the fire. There is also another pipe from the lower part of the cistern or vessel, which has a cock on it to regulate the passage away of the water and of the matters which settle towards the bottom of the cistern. It then enters into the casing over the fire and is formed into several bends, through and among which the water and the heated products from the fire pass, and by such means the contents of the pipe become highly heated and the water evaporated. The further end of such pipe is conducted into the enclosed chamber below the cistern and horizontal flue, and the more solid matters will be deposited in a compartment divided off from such pipe, whilst the steam will pass through the fire on the fire-bars. Under the flue is a shelf or horizontal partition, and there is an opening through the back, with a cover or closely-shutting door, to admit of matters being placed on the shelf to be dried. The fire-door is provided with a valve to regulate the introduction of air to the fire. The cistern or vessel is to be kept constantly supplied with the sewerage or other waters to be treated, as above explained. The number of pipes may be increased, and the drying chambers connected with the flue. After the sewerage matter has become dry it is removed from time to time and used as manure.

It will be remarked that in all the arrangements shown and described, air is excluded from the ash-pit—the space below the fire-grate—and that steam and gas are allowed to pass up through the fire, while the air necessary for combustion of the gas, produced by the decomposition of the water, is introduced on the upper side of the fire-bars; or, in the case of closed furnaces, is regulated according to the nature and state of the fuel used.

577.—Charles Roper Mead, of 176, Great Dover Street, Borough, London, gas engineer, for "*Improvements in water gas-meters.*" Patent dated March 4, 1859.

The object of this invention is to ensure a more accurate measurement of the gas passed through wet meters than has heretofore been obtained. This it is proposed to effect, first, by the use of a mechanical arrangement for maintaining the water in the measuring-chamber at a constantly uniform level, and, secondly, by a novel adaptation of floats for shutting off the supply of gas to the meter when the water-level in the reservoir is unduly depressed.

To effect this object, the motion derived from the axle of the measuring-drum or wheel is employed to operate a vibrating scoop, by which water is raised from a reservoir to make good the deficiency in the measuring-chamber caused by evaporation. This scoop is made somewhat like a trough, with an open and a closed end. It is mounted on a fulcrum-pin carried by a standard so as to be capable of rocking thereon, and it is so arranged with respect to the reservoir or waste-box and the water-box (which is in communication with the measuring-chamber as usual) that it will, when depressed, dip into the water in the reservoir, and when elevated its upper or open end will dip over the edge of the water-box for the purpose of discharging therein the water which it has raised.

Affixed to the back of the socket is a crank-arm, which, by means of a rod and crank, connects it with a horizontal shaft that has a bearing in the standard. This shaft carries a worm-wheel, which gears into a worm on the spindle of the counting apparatus. As, therefore, the measuring-wheel is caused to rotate by the passage of the gas through the meter, its axle will, through the ordinary arrangement of worm and worm-wheel, drive the spindle, and, through the mechanism just described, impart a slow vibratory motion to the scoop, which at every vibration will raise a small quantity of water from the reservoir, and discharge it into the water-box, thus preserving the water-level in that box at the height of the lip of the overflow-pipe.*

As evaporation takes place in the meter and the water becomes exhausted in the supply-reservoir, it is requisite to indicate this exhaustion to the consumer. For this purpose a float is employed, which as it falls will act on the gas inlet-valve, and cause a diminution or suspension of the supply. This float is mounted loosely on the lower end of the float-wire, which carries the inlet-valve and also the ordinary float, and is in this instance continued down through the upper box to receive the second

* This is the compensating arrangement referred to and illustrated in the last number of the Journal of Gas Lighting, p. 478.

float in the reservoir. This float-rod terminates at its lower extremity in a button, which serves to retain the float on the rod.

It will now be understood that when the amount of water in the reservoir is not sufficient to bear up the float, it will act as a weight and keep the inlet-valve closed, and, consequently, no gas will pass into the meter. But as soon as the meter is properly charged with water, the lower float will rise, and, leaving the upper float free to rise by its buoyancy, it will lift the valve and open a passage for the gas into the meter.

It will now be understood that the meter, if properly adjusted in the first instance, must always give a correct indication of the gas passing through it, as the water-line by which the capacity of the measuring compartment of the drum or wheel is determined never varies. In charging the meter with water, the water is poured in at the plug in the usual way, whence it flows into the measuring-chamber until it rises to the water-level; the surplus water flows down the pipe into the reservoir, and when sufficient water is poured into the reservoir, it will be full up to the line indicated in the drawing. Any further supply of water will flow out at the overflow-pipe.

Should the meter be overcharged with water, the pipe leading into the reservoir would be filled and the passage of the gas into the measuring-drum prevented. Should the water be drawn off beyond what it is required for working the meter, the float would fall and produce the same effect. The pipe leading to the reservoir is fitted with a sliding ring at its upper end for adjusting the height of the water-level in the water-box.

The patentee lays no claim to the exclusive use of a vibratory scoop for throwing water into the water-box, or of a float for cutting off the gas from the meter; but what he claims under this patent is, the arrangement of parts hereinbefore described for maintaining the level of the water in the water-box, and for cutting off the passage of the gas through the meter when the source of water supply is failing.

580.—JOHN LEIGH, of Manchester, surgeon, for "*Improvements in the purification of coal gas.*" Patent dated March 5, 1859.

This invention consists in the application of causticised or partially causticised gas-water or ammonia-water, which has been treated or mixed with lime or any other alkaline earth or alkali, with the view of removing the carbonic acid, together with any other acid with which such lime or alkaline earths or alkalies may combine in the gas-water, to the purification of coal gas or cannel gas, which is effected by passing the gas through the gas-water which has been so treated, in suitable vessels, in order to remove from the gas not only the salts of ammonia existing therein but also the carbonic acid, sulphuretted hydrogen, sulphocyanic acid, hydrocyanic acid, &c., which may be existing in the impure gas.

For the causticising of the gas-water or ammonia-water it is preferred to use lime, which may be mixed with the gas-water in proportions varying with the strength or specific gravity of the ammonia-water acted upon. For ammonia-water of the specific gravity of 6° or 7° of Twaddell's hydrometer, it is found that about 400 lbs. weight of dry lime is a suitable quantity for the causticising of 800 gallons of ammonia-water. The lime is first slaked, or slacked, and then the ammonia-water is added to it, and kept mixed therewith by constant agitation for a considerable time. When it is found by the reduced specific gravity—that is to say, when the gravity of the ammonia-water is reduced to 1°, 2°, or 3° of Twaddell's hydrometer—the lime is allowed to settle, and the causticised ammonia-water is drawn off into a vessel, from which it is pumped into a series of washing-vessels, being carried through pipes, and impinging from a jet pipe or flat plate at the upper part of such washing-vessel, falling thence in spray or in showers through the washing-vessel, which contains a number of shelves, covered with brickbats or other material exposing extent of surface. The gas entering at the lower part of each washer, and being brought into contact with the causticised ammonia-water, therein imparts to it not only the salts of ammonia which it contains, but also the carbonic acid, sulphuretted hydrogen, sulphocyanic acid, hydrocyanic acid, or other acid which may exist in the gas as impurities.

As some portion of the salts of ammonia may be carried forward beyond the washing-vessels mechanically by the velocity of the gas, this may be removed by passing the gas terminally through one or more purifiers containing layers of any one of the numerous substances capable of removing the salts of ammonia, or otherwise a few layers of lime.

The claim is for the use of causticised, or partially causticised, gas-water or ammonia-water for the purification of coal or cannel gas, as herein described.

606.—EDWARD DEANE, of 1, Arthur Street East, London Bridge, London, gas engineer, for "*Improvements in apparatus for the transmission of gas and other fluids.*" Provisional protection only obtained. Dated March 8, 1859.

This invention consists in the adaptation of a screw, or threaded rod, or column, or wormed plug (or shot, or small globular bodies placed between two perforated discs might answer the same purpose), inserted within the bore of the pipe used for the purpose of transmitting gas or fluids from the gasholder or reservoir to the point of use, by the adoption of which a helical or spiral passage is produced, whereby the course of the fluid is so ordered as to diminish the velocity of its flow, and this may be done to almost any extent by altering the character of the screw, &c., before mentioned. In addition to this a perforated plate may be placed across the pipe, and will then ensure that the perfect action may be obtained. This apparatus as applied to gas lighting may be placed near the burner to economize its consumption, and will prevent the escape of unconsumed gas; and it may be applied as a meter to regulate the passage of gas through it. The above is a description of the invention, which might probably be varied in its mere details.

PROVISIONAL PROTECTION
HAS BEEN GRANTED FOR THE UNDERMENTIONED INVENTIONS.

1813.—DAVID GRANT, of Edinburgh, N.B., gas-meter manufacturer, for "*Improvements in wet gas-meters.*" Aug. 22, 1859.

1922.—OLIVER MAGGS, of Bourton, in the co. of Dorset, for "*Improvements in taps, cocks, or valves.*" Aug. 22, 1859.

1954.—THOMAS CRAVEN, of Scarborough, plumber, for "*Improvements in ball-cocks or valves.*" Aug. 27, 1859.

1981.—ROBERT BEVERLEY, of Leeds, gas-meter maker, for "*Improvements in wet gas-meters.*" Aug. 31, 1859.

NOTICES HAVE BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED INVENTIONS.

1025.—JOHN MARSHALL, jun., of Selby, in the co. of York, gentleman, for "*Improvements in filtering and depurating fluids.*" April 23, 1859.

1061.—THOMAS LACEY, of Grafton Street, Westminster, gas engineer, for "*Improvements in gas-regulators.*" April 27, 1859.

1443.—JOZÉ LUIS, of 1B, Welbeck Street, Cavendish Square, London, patent agent, for "*An apparatus for regulating individually the pressure, expenditure, and light in gas-burners.*" June 16, 1859.

Legal Intelligence.

COURT OF BANKRUPTCY.

FRIDAY, SEPT. 9.

(*Before Mr. Commissioner* GOULBOURN.)

RE E. AND A. PRIOR.

The bankrupts in this case were coal merchants of Bishopsgate Street and elsewhere, and, until recently, contractors for the manufacture of gas to the Great Central Gas Consumers' Company. An adjudication in bankruptcy was made a few weeks ago, the petitioning creditor being Mr. Henry Shepherd Law, of Bush Lane, gentleman.

This was a sitting for the choice of assignees to the estate, and the assignees chosen were Mr. Thomas North, of the Babington Collieries, Nottingham; Mr. William Bean, of the Portland Collieries, Alfreton, Derby; and Mr. John Button Wilcox, of Burwood Place, Edgware Road, agent to the Clay Cross Collieries.

In reply to a question from the COMMISSIONER, it was stated that the assignees were all trade creditors to a considerable amount, and that they were chosen by creditors representing upwards of £20,000.

Messrs. Vandercom, Cree, and Co., appeared for the assignees, and Messrs. Linklater and Hackwood for the bankrupts.

Mr. CANAAN, the official assignee, stated that the debts and liabilities of the bankrupts were rather large, exceeding £80,000, and their assets had been estimated at about £20,000. They would certainly realize £10,000 or £12,000, and probably as much as £16,000 or £17,000; the actual amount, however, depending upon the result of a claim which the assignees will enforce for coals supplied to the Admiralty.

Mr. *William Scoble*, late foreman to the bankrupts at the Great Central works, tendered a proof for £10. 8s. 6d., on account of three weeks' salary. It was stated that he entered the employment of the bankrupts under an agreement for three years certain. Some months before the termination of the three years the bankrupts relinquished possession of the works over which he had been placed as foreman, and intimated to him their desire to terminate his engagement. He, however, continued to reside in the place where the works were situate, and, though he had not since had any duties to perform, claimed the sum to which his wages would have amounted under the agreement if he had been retained in service until the end of the three years.

The COMMISSIONER expressed his opinion that the claimant's proof could not be admitted until the amount due to him had been determined by a jury. He, however, adjourned the further consideration of the proof without prejudice to the claimant, advising him to take legal advice upon the matter in the mean time.

Mr. HACKWOOD applied for an allowance to the bankrupts.

The COMMISSIONER asked what the assignees thought about it?

For the assignees it was stated that they expected the bankrupts would have to devote the whole of their time to the preparation of their accounts, which were exceedingly voluminous, and therefore they should not object to an allowance of £5 per week being made to each.

The COMMISSIONER said it was his practice on all occasions, in ordering an allowance, to make its amount dependent upon the exertions of the bankrupt himself, and to increase it if the accounts were prepared in proper time—*i. e.*, ten days before the day appointed for the bankrupt's final examination. He should therefore make the order for £4 a week to each of the bankrupts, to be increased to £6 each in the event he had mentioned happening.

Debts to the amount of about £45,000 were proved in the course of the day.

Miscellaneous News.

UNITED GENERAL GAS COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held on Tuesday, Sept. 6, at the Offices of the Company, Austin Friars—J. O. HANSON, Esq., in the chair.

The SECRETARY read the advertisement convening the meeting, and the following report of the directors:—

This half-yearly general meeting has been convened in compliance with the provisions of the company's charter, and in laying before the proprietors a report of the last half year's operations, it will be seen that the profits amount to £6089, being £392 more than the corresponding period of 1858.

At Dublin we have the satisfaction of announcing an improvement in rental, principally arising from new customers; this improvement is the more gratifying seeing that a reduction in price came into operation on the 1st of January last.

Beyond this additional rental, we are happy to say the coke and other products have increased likewise.

We have already found great advantage from the new 24-inch trunk main recently laid, and confidently expect that when the remaining portion is completed we shall derive still further advantage.

Several extensions and improvements have been made since last season to the works and district, and others are in contemplation, in order to enable the company at this station to keep pace with the increasing demand for gas.

Besides the new gasholder alluded to in the last report, and which will be in readiness to meet the winter requirements, we have put up a powerful new exhauster, and laid connexions thereto, a new station-meter and house for its reception, together with extensive improvements to the coal store, &c.

These various alterations and additions to the company's plant, together with those intended, will require a considerable outlay.

Since our last half-yearly meeting, and as reported to you at the special meeting on the 10th of May last, the agreement with the Cork Consumers' Gas Company has been carried out, and we have received a first payment, given over the works and district mains, and obtained from the company the mortgage thereon.

You have been previously informed that the basis of sale of our property there was fixed by the agreement on an annual consumption of 28,000,000 cubic feet of

gas, and should the ascertained quantity exceed or fall short of that consumption, the amount of the purchase money would be increased or diminished in proportion. We are happy to state that the year's sale of gas has exceeded that stipulated quantity; the exact amount to be added to the purchase money, in consequence, has not yet been precisely determined, but we do not anticipate any difficulty in satisfactorily arranging it.

In announcing these particulars, it affords us much pleasure in stating that the directors and officers of the new company at the period of transfer courteously afforded us every facility in carrying out the provisional arrangements entered into by the respective proprietors last May.

At Limerick the rental has increased, and the works and district are in a satisfactory condition, both as to power of supply and general management.

Taking the prospects of the company into consideration, we feel justified in recommending the proprietors to declare a dividend of 13s. 6d. per share, free of income-tax, out of the profits of the past half year, and the balance to be carried to the stations contingency account, as usual.

Three of your directors—Mr. Burmester, Mr. Hudson, and Mr. Wheeler—and Mr. Smyth, one of your auditors, go out of office this day by rotation, and, being eligible, offer themselves for re-election.

The CHAIRMAN then said: Gentlemen, at our last special meeting I distinctly stated to the proprietors that the arrangements which we had entered into at Cork would not in the slightest degree affect our profit and loss account for the six months that have just now expired, inasmuch as the agreement only took effect from the 1st of July. I am very happy to state that, notwithstanding the loss which we have sustained of £916 at Cork, notwithstanding a reduction of 3d. per 1000 feet at Dublin, our profits have amounted this half year to £6089. 5s. 9d., which is better by £392 than the corresponding period of last year, and better than the period to December by about £80 or £90. Looking, therefore, to the fact that we have stopped the loss at Cork, we may naturally look forward to a better state of things when we meet again in March next, and we have not hesitated to declare an increased dividend of 1s. per share. It is what we have earned, but it leaves only about £14 to carry over. Still, as the proprietors have earned it, and, with our future prospects, we hope to place before you a more satisfactory state of things next December, we have not hesitated to divide as close as we could. (Hear, hear.) The proprietors will recollect (and the report refers to it) that our agreement with the new company was on a consumption of 28,000,000 cubic feet, for which we were to receive £26,000. If the consumption proved more, we were to have a proportionate increase in the price; and, on the other hand, if the consumption fell off, we should have had to make a reduction. I am happy to say that, as far we can judge, and looking to the consumption that is actually ascertained, we believe we shall derive between £2000 and £3000 greater benefit from the arrangements at Cork than was stipulated for. (Hear, hear.)

A PROPRIETOR: Is that between £2000 and £3000 per annum?

The CHAIRMAN: No—purchase money and interest. The purchase money is payable in ten yearly instalments. I am happy also to mention that the Cork Consumers' Company have fulfilled very honourably and creditably their engagements with us, so far as to pay us £2300 on the 1st of July last, as part of the first instalment. (Hear, hear.) We have also ascertained the value of our remaining stocks, which is £480. 12s. 3d.; which sum, I believe, is payable on the 1st of September.

The SECRETARY: Yes, and it will be received next week.

The CHAIRMAN: So far, I think, we have done very well; and there is little now left for us to do at Cork except to adjust the account, which I believe will be very easily done; to call in the outstanding rental for the June quarter, and to collect our arrears. When we have done that I believe we may take leave of Cork. With respect to the working of the company for the half year, the increase of rental and products together is £1762 over the corresponding period of last year. But on the other hand our expenses have a good deal increased. Although at Dublin we have reduced our price 3d. per 1000 since January, we have made it good so far by an increase in the rental. At Limerick we have also an increase of rental, but the general cost of coals is £368 more than in the corresponding period of last year. Our wages have been high, particularly at Dublin; and this is a matter that the directors are very anxious to check. They look very closely into the wages account at Dublin; but there is a great deal of new work going on there, which may, in some measure, account for the increase, which is £462 over the same period of last year. If we take the rental and products on one side at £1762, and the increased charges on the other at £1370, it leaves us the sum mentioned, £392, as a balance on the gross working. The loss at Cork I see is £916. 3s. 1d. I told the proprietors at our last meeting that the great object which the directors had in view was to check the loss that was going on there. We have not only done that, but made arrangements by which you will derive a benefit to the extent of £1000 a year. (Hear, hear.) There is an item in the balance-sheet which, perhaps, may require some little explanation, and that is the stations contingency account. There appears to be a sum credited to that account of £13,572. 7s. 3d.; but, on the other hand, we have made payments during the last half year to the extent of £11,120. Our accountant, Mr. Follett, who is very particular in all these matters, has not written the amounts off from the stations contingency account yet, because they are payments merely on account. If they had been written off, they would have reduced the stations contingency account to about £2500, to meet the future outlay that we may be called upon to make. The great feature in the expenditure at Dublin for the past year has been for mains and syphons, laying and paving, labour in works, new tank, and payments to the contractor, Mr. Piggott, for the new gasholder; also for new retort-house, &c., &c., altogether £11,120, and *already paid*. We have also to provide £2100 for works at Kingstown, which will pretty nearly exhaust the balance of the stations contingency fund. But, at a future time, we have still further improvements to carry out in re-sheeting four gasholders at Dublin, laying mains at Sandymount and in the neighbourhood of Kingstown and Dalkey, which improvements are all very necessary, seeing that we have the entire lighting of those districts. I mention these facts to show the proprietors that we are quite alive to our position at Dublin, which we must all bear in mind is our great position now. We must give the public the advantage of the best light possible without incurring any unnecessary outlay. It may be satisfactory to the proprietors to know that the outlay, particularly at Dublin, has not been unprofitable or wasteful. I may mention that during the last twelve years we have laid out there, up to December, 1858, no less than £40,059. The proprietors may naturally ask what we have to show for it. We show this:—that the rental in Dublin, which was £39,794 twelve years ago, has now increased to £51,571, being an increase of 29 per cent. The profit, which in 1846 was £11,948, is now £16,653; an improvement of £4705, or at the rate of 39 per cent. If you take that on a capital of £40,000 it gives you 11 per cent. for your money. This will satisfy the proprietors that the expenditure has neither been extravagant nor wasteful, but that we have received a solid and substantial benefit from it. (Hear, hear.) I may mention that a lady, who is a proprietor and lives at a distance, is continually writing to me, as chairman, and sometimes to Mr. Ogg and Mr. Follett, to know what we have done with our Mill-boy money. The simple answer to that is, that twelve years ago we were in debt £25,000, owing upon debenture bonds. We owed our bankers £7500, and had outstanding debts amounting to £12,670, making together £46,070 that we were in debt at that time. How has it been paid off? We made a call of £1 per share, making £9000; we had stock, which we held on a sinking fund, amounting to £9926, and we have sold our Mill-boy works for £29,117, making together £48,043; so that we really have only got £2000 out of the sale of our Mill-boy works available. That is the answer we must give to any one who wishes to know what has become of the money. If there is any further information required by any proprietor I shall be glad to afford as far as lay in my power. (Hear, hear.)

Mr. PERRY: I move that the report and accounts now read be received and adopted.

Mr. RHODES: I beg leave to second that, and would ask how the item of £400 excess of expenditure at Dublin arose?

The CHAIRMAN: We have a very large establishment, and a great number of men there in consequence of new works which are going on there, and therefore it is difficult to point to the specific cause.

Mr. CHAPMAN: We have been obliged to increase the wages of the stokers owing to the use of the clay retorts.

Mr. RHODES: Is that the cause of the £400 increase?

The CHAIRMAN: Some portion of it. It is difficult to analyze the accounts while new works are going on; but perhaps Mr. Follett can answer your question.

Mr. FOLLETT (accountant): While such new works are going on, the wages are charged to the stations contingency account, but the above £400 was not.

Mr. RHODES: I am very pleased with the report and accounts which we have heard read this day; more especially, as I have received a report from the board of directors of the Gas Consumers' Company at Cork, who state that they are very happy to inform their shareholders that they have come to a settlement with this company, and that they never met with a more honourable board of directors than the gentlemen who manage the affairs of this company. (Hear, hear.) I must say our directors deserve our thanks for the manner in which they have carried us through this difficulty. I own that, at first, I wondered where it would end. I think the directors have acted wisely in the sale of our Cork works; and I believe the shareholders will derive great benefit from it. I think something was said in the accounts about some stocks remaining at Cork.

The CHAIRMAN: They pay for the coals and stock.

Mr. RHODES: Independent of the purchase?

The CHAIRMAN: Yes. I believe we reserved also 200 lamps-posts which will be useful to us at Dublin.

Mr. NELSON: I was not present at the last meeting, and I should like to ask what was the total amount we have expended at Cork?

The CHAIRMAN: The outlay we proved before the House of Commons was £56,000.

The resolution for the adoption of the report then passed unanimously.

Mr. PERRY: I beg to move—"That a dividend of 13s. 6d. per share, free of income-tax, be declared out of the profits of the last half year, payable on the 3rd of October next."

Mr. BOODLE: I second that motion.

The resolution passed *nem. dis.*

The three retiring directors and auditor were unanimously re-elected.

Mr. BURMESTER acknowledged the vote, and assured the proprietors that, so long as he and his colleagues filled the position of directors, they would continue to watch over the interests of the shareholders.

Mr. HUDSON observed that, though he was lately in Ireland on a pleasure trip, he took the opportunity of visiting the works at Limerick and Dublin, where he was joined by Mr. Chapman; and he felt sure that when the works now in progress were completed, they would be as efficient as any local works in the kingdom.

Mr. RHODES inquired whether clay retorts were used in Limerick?

Mr. CHAPMAN explained that at that station there was no exhauster, and it was thought better not to use clay retorts.

Captain SHEA said, as the business of the day was concluded, he thought the proprietors could not do less than return the directors their cordial thanks for the manner in which they had conducted the business of the company, and he would propose—"That the best thanks of the company be tendered to the directors and officers of the company for their attention to the business of the company."

Mr. RHODES seconded the motion, which passed unanimously.

The CHAIRMAN briefly acknowledged the compliment on behalf of himself and his colleagues, assuring the proprietors that their approbation was the most powerful stimulus to the directors to watch narrowly over the interests of the company.

The meeting then separated.

WESTMINSTER DISTRICT BOARD OF WORKS.

The Ordinary Meeting of the Board was held at the offices, Great Smith Street, on Friday the 8th inst.—Mr. GODSON in the chair.

LIGHTING THE PUBLIC LAMPS.

Mr. JEBB, the clerk to the board, brought up a report from the committee of works with reference to the replies received from the Chartered and Equitable Gas Companies, stating the terms and conditions on which they will be willing to light the public lamps in this district; and submitting certain objections to the terms proposed by the gas companies. The report stated that, pursuant to the resolution of the board of the 12th of August, the committee had had under consideration the replies received from these companies to the communication of the board as to the terms and conditions upon which they would continue the public lighting of the district after Christmas next, when the present contract expires; that as to the letter of the Chartered Company they considered there was no objection to the term for which they proposed to contract; that as to the required permission for opening the ground, for the purpose of laying new mains, &c., the committee were of opinion that the clause in the present contract on this subject should be insisted upon; that they saw no objection to the clause proposed in reference to the time for commencing to light and extinguish the lamps; that as to the price to be paid for each lamp the company agreed by clause 4 to give to each burner an illuminating power equal to 8 sperm candles, 120 grains, for 70s. per annum; by clause 5, equal to 10 sperm candles, for 85s.; and clause 6, equal to 12 sperm candles, for 95s. each. The committee selected clause 5 of the company's proposal (£4. 5s. each lamp): that they objected to clause 7 by which the company sought to be exempted from penalty in case of accidents, strikes, or causes over which they had no control; that they also object to the following clause which provides that penalties are not to be inflicted unless the company neglect to attend to written complaints for six hours, and that no penalty be inflicted twice for

the same offence unless the company neglects to attend to it for the space of twenty-four hours, and that they saw no objection to the proposed alteration in the amount of penalty to be inflicted. The committee further reported that with regard to the letter received from the Equitable Gas Company, they objected to the terms and conditions therein proposed, as being indefinite.

The consideration of the report engaged the board for some time, and the recommendations of the committee were, on almost all the points, agreed to. In reference to the price to be charged,

Mr. HORN reminded the board that the public lamps would be lighted at a cheaper rate than they had ever before been done.

Mr. ARNTZ, the surveyor to the board, in reply to an inquiry, said the advantage of having the quantity of gas to be consumed specified as well as the quality, was that one set of experiments was sufficient to prove whether the company were fulfilling their contract. If the question was to be that of light alone, irrespective of quantity, it involved a double set of experiments, which must go on at the same time. For instance, if it were alleged that at a particular hour of the night a lamp was burning a deficient quantity of gas, in order to form a legal proof, the illuminating power of the gas at that precise moment must also be taken. It involved, therefore, the action of two men working together, one making experiments upon the quality, and the other upon the quantity; so that the legal proof was much more complicated and much more difficult than if the quantity were one element and the illuminating power of the gas another. In reference to purchasing the gas for the public lamps by quantity, he could see no possible objection to that, as every private consumer was so supplied.

Mr. ROGERS, in reference to the proposed alterations in the penalty clauses, said there were several arbitrary provisions on this subject in the existing contract which the company were anxious to get rid of. The penalties to which they were now subjected were some of them in the discretion of the board, and others in the discretion of the surveyor, and against their infliction the company had no appeal.

The CHAIRMAN believed that, except in one instance, they had never been enforced.

Mr. ROGERS said he had latterly been watching a case in which the London Gas Company had sued the Chelsea vestry for an amount due under their contract. The objection taken by the vestry was that the company had not supplied gas of the quality they had contracted for. The company replied that they were prepared to prove that they had, and the vestry rejoined that, even if they had, they had not kept their lamps clean nor lighted from sunset to sunrise, and therefore they would try the main question, knowing that if they failed on that the company must pay the cost of the trial, because they had not in other respects fulfilled their agreement. For this reason the companies were now kicking against the infliction of such penalties as these. He would suggest the adoption of a resolution to the effect that though the board would not agree to the proposition of the gas company on this point, they would not object to a modification of the penal clauses in the existing contract.

After some conversation this suggestion was agreed to, not only in reference to this clause, but also the following, by which the company sought to fix the penalty at an amount not exceeding 10 per cent. upon the price paid by the parish for each lamp.

Mr. MALLOCK proposed that a committee, consisting of three members of the board, should wait upon the directors of the companies to represent the objections of the board to the proposed terms and conditions, and endeavour to get a modification thereof.

Mr. HORN dissented from the proposition, and suggested that the proper and most expeditious mode was for the clerk to write to the companies.

Mr. CLARKE thought it would be well for the clerk to write to the Equitable Company, and request them to state definitely the terms upon which they would be willing to renew their contract.

A discussion ensued as to the propriety of appointing a special committee to conduct the negotiations, and ultimately it was resolved to refer the matter back to the committee of works, with instructions to take the necessary steps and to report their proceedings to the board.

THE SALE OF GAS ACT.

At the last meeting of the Liverpool Town Council the following report from the Watch Committee was submitted for consideration.

The deputation appointed to attend to the bill for regulating the sale of gas report as follows:—

The bill, as brought from the Lords and submitted to the Commons in committee, proposed to deny to municipal corporations and boroughs all jurisdiction in reference thereto within their own districts, and to vest the same in the county justices exclusively. The bill, as sought to be amended by Mr. Murray, proposed to enable such corporations to obtain the power of carrying out the Act within their boundaries, but to give to the recorder the right of determining the number of districts into which the borough might be divided, the number of inspectors to be appointed, the amount of salary to be paid to them, and the selection of the persons to fill the situations, leaving to the council simply the duty of providing the necessary funds.

For the purpose of remedying these and other objectionable clauses your deputation proposed amendments, the whole of which were adopted, and the Act passed on the 13th of August instant.

The effect of the statute is that before the 14th of November next the Government is to provide models of the standard cubic foot measure for gas; and after the 13th of August, 1860, no meter is to be fixed for use without being first tested and stamped by an inspector of meters, under a penalty of £5. A period of ten years is allowed for meters at present in use to be worn out, but with power to consumers after August, 1860, to have all their meters tested and stamped if they think fit.

The fees appointed to be paid for testing are higher than those at present charged in Liverpool—namely, 6d. for a meter delivering one cubic foot in four or more evolutions, 1s. for those delivering a cubic foot in fewer than four evolutions, and the further sum of 1s. for every additional foot beyond one delivered at one evolution.

A meter duly stamped under the Act by any inspector may be used in any part of the kingdom.

The expenses of carrying out the Act are to be borne in counties out of the county rate, and in boroughs out of the lighting rate, or, if none, out of the borough fund; and all fees and penalties are to be applied in aid of the account on which the cost is chargeable.

It is discretionary with town councils whether or not they will adopt the Act for their district. The power is to be exercised by them within six months, otherwise the statute will for ever afterwards have to be administered by the county justices acting for the borough as well as the county, and they will have to make all the appointments, fix the number of inspectors, and regulate the pay at the expense of the borough lighting rate. Town councils intending to adopt the Act are merely required to pass a resolution to that effect by a majority of members present at any council meeting—a month's notice being first given for the purpose; and at the meeting next after such adoption they will have to appoint an inspector and make the other necessary arrangements prescribed by the Act for carrying the same into operation.

At a meeting subsequent to that at which the report was adopted, the attention of the committee was directed to the arrangements with the gas company for testing gas-meters, as affected by the Sale of Gas Act; and it appeared that the company were willing to continue, as heretofore, to supply meters to be tested by the inspector until the Act came into full operation' in August, 1860, and to pay the fees thereby prescribed, upon the understanding that the corporation should, in the event of the council adopting the Act for the borough, restamp the meters so tested, when the statute takes effect, without further charge.

Mr. CLINT moved the adoption of the recommendation that the requisite notice of one month should be given for the adoption of the Act. He fancied we should carry out the Act with much the same machinery as now. An inspector would have to be formally appointed by the Town Council.

Mr. JEFFERY said it must be highly gratifying to the council to find that the course which they felt it necessary to pursue had been adopted by the Legislature for the whole of the United Kingdom. The council appointed a committee for the purpose of inspecting the meters, and to see that the measure afforded to the public was an accurate one. There was, however, no standard by which meters could be tested or set. By the able and talented assistance of Mr. Alfred King such a measure had been obtained, but at a serious cost to this council. That standard, he was told, had been in its integrity adopted by the Government, and embodied in this bill. This council was the first to feel the want, and what it did municipally had been adopted by the imperial Parliament.

The recommendation was agreed to unanimously.

The same subject was mentioned at the last monthly meeting of the Manchester and Salford Licensed Victuallers' Association, when the chairman (Mr. Andrew Dobbie) said they would be glad to learn that the Sale of Gas Bill, for the safety of which the innkeepers had been very anxious, had received the royal assent. One of the principal arguments urged in promoting this useful measure had been that it would involve no new machinery to carry it out. That the same inspectors of other measures would be able to carry out the duties required by the Gas Act; and hitherto he believed that the conduct of the Manchester and Salford inspectors had been most praiseworthy, and the interest of the public impartially promoted. It was due to the exertions of their secretary that he should read the following letter from their member, Mr. Massey, as a sample from a number of letters of a like complimentary nature:—

Bolton Hall, Bedale, Aug. 17, 1859.

Dear Sir,—You will have observed that the Sale of Gas Bill has received the royal assent. The gas consumers will have reason to be thankful to the promoters of this useful measure, in which you have taken an active and zealous part. Your exertions will, I hope, redound to your advantage.—Believe me, faithfully yours,

W. N. MASSEY.

The chairman thought the public owed a debt of gratitude to each of the representatives of Manchester and Salford, for their attention during the progress of the Gas Bill.

METROPOLITAN BOARD OF WORKS.

REPORT ON THE DEODORIZATION OF SEWERAGE, ADDRESSED TO THE CHAIRMAN OF THE METROPOLITAN BOARD OF WORKS.

Sir,—Having been requested, by a resolution of your board, bearing date the 27th day of May, 1859, to undertake the duty of advising the board as to the selection, from the various schemes proposed for the deodorization of sewerage, of a process combining both efficiency and economy, we now beg leave to report to you the results of a minute inquiry into this subject.

In conducting our investigation, we have carefully kept in view the final plan of dealing with the sewerage adopted by the board, the principal features of which were lucidly described to us in a letter from your chief engineer.

Not the least arduous part of our labours consisted in the careful examination of the numerous, and in many cases ponderous, documents addressed to the board on this subject, and transmitted to us for consideration. Short abstracts of these proposals will be found in the appendix.

This examination led us to the conclusion that a comparatively very small number only of these proposals admit of application in conformity with the plan of dealing with the sewerage finally adopted by the board.

The comparatively small number, admitting of such application, experienced a further limitation when the several processes were submitted to experimental trial. In fact, of all the proposals, old and new, referred to us, there is only one which appears to satisfy in the necessary degree the conditions involved in the circumstances of the case.

The agent to which we allude is that described as "Dales' *muriate of iron*," essentially a concentrated solution of perchloride of iron, the disinfectant properties of which were some years ago pointed out by Mr. Ellerman. This we have submitted to an extensive series of comparative trials with the well-known disinfectants, lime and chloride of lime, which, probably owing to their long-established character, are not included in the proposals before us.

These trials lead to the conclusion that the deodorization of sewerage may be effected either by perchloride of iron, chloride of lime, or lime; but that, if quantities of equal value* be applied, the perchloride of iron is markedly superior to either of the others, whilst chloride of lime acts much more powerfully than lime.

These statements refer both to the immediate action of the three agents upon sewerage, and to the permanency of the effect produced; but when examined from the latter point of view the superiority of the perchloride of iron is exhibited even in a still more marked degree.

It may be stated that these results were obtained by operating upon sewerage, such as flows from the mouths of the chief metropolitan sewers during the hottest season of the year, our experiments having been performed during the latter half of the month of July.

Since the calculations as to the cost of deodorization are based upon these experiments, it may not be out of place here to mention briefly the mode in which they were conducted. In order to enable us to operate upon a sufficiently large scale, brickwork tanks, lined with cement, and holding 7500 gallons each, were constructed at the outfall of the King's Scholars' Pond Sewer. The sewerage was lifted into these tanks by means of a steam pump, and the various deodorizing agents were incorporated, either by their gradual introduction into the shoots during the process of filling, or by diffusing them through the mass of the liquid by means of mechanical agitation.

* We have endeavoured to arrive at the average prices of these three agents. It appears that they are subject to considerable fluctuation. As the average results of our inquiries, we have taken the value of lime at 9s. per cubic yard = 18 bushels; the value of chloride of lime of 36 per cent. (about the strength of that used in our experiments), at £12 per ton; and that of the perchloride of iron solution, specific gravity 1.45, at 6d. per gallon. Probably these prices would be subject to a certain amount of reduction if very large quantities were consumed. We should state further, that the estimation of the value of perchloride of iron is founded upon our knowledge of the price of its ingredients and the cost of manufacture, although Messrs. Ellerman and Dales, who have proposed this liquid, quote 1s. 6d. as their maximum price per gallon.

From a number of experiments thus conducted, it appears that each of the three agents above mentioned will effect the immediate deodorization of 7,500 gallons of sewerage when applied in the following proportions:—

Perchloride of iron	½ gallon.
Chloride of lime	3 lbs.
Lime	1 bushel.

From these results it follows that 1,000,000 gallons of sewerage require respectively—

	£	s.	d.
66 gallons of perchloride of iron, costing	1	13	3
400 lbs. of chloride of lime . . .	2	2	10½
132½ bushels of lime	3	6	6

During the performance of these experiments, which, as already stated, were made during the hottest portion of a dry season, we were surprised to find that the liquid flowing from the outfall of the sewer was by no means strongly offensive; it was only after preservation in tanks for twenty-four hours, or upwards, that a really powerful odour manifested itself. This circumstance rendered it of the highest importance to inquire more closely into the degree of permanency of the effect produced by the several agents under consideration.

For this purpose, three equal quantities of sewerage were collected, and perfectly deodorized respectively by perchloride of iron, chloride of lime, and lime: they were then allowed to stand. After two days, the sewerage disinfected by lime became slightly tainted, whilst that deodorized by chloride of lime and perchloride of iron remained perfectly odourless. At the end of three days the limed sewerage had become decidedly offensive, whilst the other two specimens still remained free from smell. After four days the odour of the limed sewerage had become worse, but that treated with chloride of lime likewise began to exhibit an offensive character, whilst the sewerage to which perchloride of iron had been added remained perfectly inodorous. Even after the lapse of nine days the condition of the latter had not changed. In other experiments the same relative permanency of effect has been observed.

Another important element in estimating the comparative fitness of an agent for the treatment of sewerage, is, the time required for clarification after the addition of the disinfectant. In this respect, also, the results of the preceding experiments lead us to give a decided preference to perchloride of iron.

It now remains to apply the results thus obtained to the circumstances of the case before us. From the statements in Mr. Bazalgette's letter, it appears that it is at present contemplated to collect the larger proportion of sewerage in two reservoirs, to be constructed respectively at Barking Creek and Crossness Point, in which it would be allowed to settle for about nine hours and a half, in order to be discharged into the river during the first two hours and a half of the ebb tide. The third portion of sewerage, we learn from Mr. Bazalgette's letter, will be pumped into the river all the year round at a point near Cremorne Gardens, termed the outfall for the western division. The subjoined table gives the quantities of sewerage discharged at present daily, according to Mr. Bazalgette's estimate, and likewise the quantities anticipated in future years:—

	Present.	Prospective.
Discharge of sewerage at Barking Creek	56,536,875	62,500,000
Ditto at Crossness Point.	20,066,250	35,937,500
Ditto of the outfall of western division	4,646,875	9,375,000
Total	81,250,000	107,812,500

The sewerage discharged at Barking Creek and Crossness Point would probably not require deodorization, except during the hot season of the year —say during three months. Supposing the deodorization to be effected by perchloride of iron, the disinfection of this portion of the sewerage at the present rate of flow would involve an expenditure of £11,620. 13s. 9d. for the three months. We are, however, of opinion that in practice the sewerage discharged into the river at this distance from the metropolis would rarely require deodorization for so long a period as three months. In fact, we are not without hope that the sewerage, supposing it to arrive at these outfalls in a condition similar to that in which it is at present discharged from the King's Scholars' Pond Sewer, would, when properly freed from suspended matter, only require deodorization under particularly unfavourable circumstances.

With regard to the sewerage discharged at the outfall of the western division, it will be indispensable to submit it to a systematic deodorization the whole year round. Owing to the comparatively small fraction of the sewerage delivered at this point, a very moderate sum would cover the expense—£2821. 3s. being the cost of the disinfectant for the year.

Having thus stated the results of our experiments regarding the process of deodorization, it remains only to draw particular attention to the importance of discharging the sewerage into the river as free from mechanically-suspended matter as possible. We have found that this suspended matter, when separated even from the deodorized sewerage, rapidly passes in warm weather into a state of active putrefaction. The removal of this matter would, in a great measure, prevent the formation of any offensive deposit upon the banks of the Thames, not to speak of the improvement in the appearance of the river which would thus be secured. We are therefore of opinion that filtration should be invariably employed at the outfall of the western division, and that subsidence, if not actual filtration, should be resorted to at the two remaining outfalls.

The putrefactive tendency of the deposit separated by filtration or subsidence, renders its rapid removal from the reservoirs or filters a matter of the utmost importance, especially during summer; for the process of putrefaction, when once commenced, can be arrested only be quantities of disinfectants practically impossible.

It is not within our province to enter into details respecting the mechanical arrangements necessary for the application of the disinfectant, or for the filtration and subsidence of the sewerage; but we beg to express our opinion, based upon the experience acquired during this investigation, in manipulating with comparatively large quantities, that the disinfection of vast volumes of sewerage can be more easily accomplished than is generally believed, and than we ourselves anticipated at the commencement of our inquiry. The actual process of deodorization will probably present less difficulty than the mechanical separation of the deposit by filtration or subsidence. This separation will involve the temporary storage of immense quantities of sewerage, the rapid removal of large quantities of deposit, and a number of operations which can be successfully carried out only with considerable system and under strict inspection. Operations of this kind should be as far as possible conducted at a distance from densely populated districts; and we consider it therefore a happy feature of the scheme adopted by the board, that a small fraction only of the total amount of sewerage requires to be manipulated in the immediate neighbourhood of London.

We have, &c.,
(Signed) A. W. Hofmann,
E. Frankland.

London, August, 1859.

APPENDIX.

In the body of the report we have alluded to the considerable number of proposals addressed to the Metropolitan Board of Works, and referred by them to us for examination. In order to divest the report as much as possible of embarrassing detail, we have refrained from entering into a description of each of the several suggestions which have been made. We have, however, thought it desirable to give condensed abstracts of these proposals in this appendix.

John T. Barry, Esq., proposes proto-sulphate of iron as a disinfectant for sewerage, and also suggests that charcoal might be introduced into the air-spaces of sewers, in order to destroy noxious gases.

G. Lindsey Blyth, Esq., recommends that super-phosphate of magnesia should be mixed with the sewerage, which should then be precipitated with lime, or another alkaline earth, the object being the production of a manure.

W. Burness, Esq., recommends separate systems of drainage for sewerage and for surface water. The latter he would filter, if necessary, before its discharge into the Thames; the sewerage he would pump to the proper level, and pass through suitable pipes for distribution in the surrounding agricultural districts, completing the distribution before the sewerage had time to putrify and become offensive. He is of opinion that the value of liquid manure is much greater than that indicated by its constituents, because "during the process of decomposition of animal and vegetable matter, oxygen is worked up both from water and the atmosphere; consequently hydrogen is liberated from the former, and nitrogen from the latter; so that these two uniting, form ammonia, one of the best fertilizers,

Gurney Burt, Esq., states that he will shortly make a proposal for utilizing the London sewerage, without deodorization, by distributing it over the country by means of the railways.

Henry Callen, Esq., recommends the dodorization of sewerage by galvanic or electric agency.

John Chisholm, Esq., makes a similar proposal.

Henry Bollman Condy, Esq., calls attention to the manganates and permanganates as powerful agents of deodorization and disinfection.

Henry Cornfoot, Esq., suggests ferruginous sulphate of alumina, commonly called Moll's Patent Reactive, as a deodorizer for sewerage.

Daniel Dealey, Esq., chemist, and William Richards, Esq., engineer, propose to generate chlorine from "a mixture of muriatic acid and quick lime," on board a steamer, which is to be "constantly running up and down the river, and discharging the gas on both sides as it goes along."

Richard Dover, Esq., advises to flush the sewers daily "with the antiseptic hydrochloric acid, and liquefied proto-sulphate of iron and chloride of sodium combined."

C. F. Ellerman, Esq., recalls attention to the use of perchloride of iron, which he has proposed some years ago as a disinfectant.

Richard Ely, Esq., intimates that he has a process for the preciptation of sewerage in reservoirs, of which no further description was obtained.

Charles F. A. Glassford, Esq., proposes to carry off the rain-water in the sewers, and to make such arrangements in the houses as to allow only a limited quantity of water to become mixed with the excreta. This mixture is to be collected in vessels to be daily discharged into reservoirs, where it is to be mixed with sulphuric acid, and allowed to settle. The liquor is to be then evaporated, and the solid matter squeezed through such filter-presses as are used at the Leicester Manure Works.

G. Garbert, Esq., of Mauritius, suggests the abolition of water-closets, and the substitution of boxes containing peat charcoal.

M. Gronvelle proposes to deodorize by means of a pyrito-aluminous lignite, commonly called "cendre noir," which is stated to be extensively used by the scavengers in Paris.

William Goreham, Esq., communicates the following plan:—To form reservoirs at the mouths of the sewers; to allow the sewerage to settle in these reservoirs; to remove the sediment by trays, and to disinfect and dry the contents of the latter by placing them in chambers through which the products of combustion of a suitable furnace are passing.

John Hitchman, Esq., gives his arguments in favour of—

> "The rainfall to the river,
> The sewerage to the land."

Mr. Howard, British Minister in Lisbon, reports on a contract between the municipality of that town and a company formed for collecting the excreta and converting them into sewerage. The company propose to supply each house with a separating apparatus and with the necessary disinfectant (the nature of which is not stated). The municipality will compel the inhabitants to use the apparatus, and proposes to furnish the land for the works.

Henry Kemp, Esq., suggests "pyritous peat" for deodorizing sewerage. In a second communication Mr. Kemp enters into some details regarding the mode of applying the peat, which he proposes to enclose in wire cages attached to the sterns of the river steamers; and he advises the introduction of similar cages into the mouths of the sewers.

Charles F. Kirkman, Esq., offers to exhibit upon a large scale the practicability of a plan which he has successfully employed upon a small scale. He does not state the nature of the plan in his original communication, but in a subsequent letter mentions that his method is not a chemical one.

James Knight, Esq., proposes to establish a number of filter-beds on each side of the mouth of a sewer, and to allow only the clear water from which the solid matter has been deposited to flow into the Thames.

C. N. Kottula, Esq., proposes to remove the Thames' nuisance by increasing the specific gravity of the river over that of sea-water, "so that the river-water may become heavier than that of the sea, whereby the former, instead of being driven back by the incoming tide, will give way to the flow of the sea-water, and will allow it to flow up, while the river-water will run out, or at all events remain under the sea-water." He thinks he can accomplish this object "by dosing into the river at various points common salt."

M. G. M. Legé suggests to attach to the drain of each house a receptacle so constructed as to allow of the separation of the liquids from the solids; the former to be permitted to pass into the sewers, and the latter being removed once in eight or ten days to be converted into manure.

M. Louis Napoleon Legras states that he has invented a deodorizer which is applicable to London sewerage water, and which produces a valuable manure. The nature of the agent is not stated, and no information could be obtained on application.

A. M'Dougall, Esq., and Dr. Angus Smith propose the use of carbolate of

lime in solution, and also of a solid mixture of sulphites and carbolates' These substances are to be added to the sewerage to produce immediate and permanent deodorization.

F. C. Maguire, Esq., advises to convey the sewerage to railway stations, and then to trasmit it to the surrounding agricultural districts through earthenwire or iron pipes. If necessary and practicable, he would filter it through dry sewers constructed over the present drains, converting the solid matter into manure, and deodorizing the filtered liquid in subterraneous deodorizing docks; the deodorized fluid to be then pumped into reservoirs at levels, sufficient to allow of its being conveyed in pipes along the various lines of railway to the provinces. He proposes no method of deodorization.

M. J. Marino, of Copenhagen, communicates a plan for inodorous water-closets.

Dr. Henry Medlock suggests that sewerage would probably be deodorized by means of scrap iron, and subsequent filtration through beds of sand and charcoal; but he states that he has not yet had an opportunity of testing the efficacy of this suggestion on a sufficient scale, and by a sufficient number of experiments.

M. Moll, *vide* Henry Cornfoot, Esq.

George F. Morrell, Esq., calls attention to the deodorizing properties of chloride of zinc.

The Rev. Henry Moule proposes to separate the sewerage from the rainfall; the liquid portion of the former to be evaporated—the solid to be dried and deodorized. The ordinary modes of evaporating are stated to be chimerical, but the plan proposed is rendered perfectly possible "by the discovery in November last of something in the nature of steam which was hitherto unknown."

W. Oldham, Esq., suggests to separate the solid filth from the sewerage, and to distribute the liquid over the land in the neighbourhood.

M. Paulet, Fils, recommends the use of a mixture of sulphate oleate and chloride of zinc, and of sulphate of manganese, for the deodorization of sewerage.

William Richards, Esq., *vide* Daniel Dealey, Esq.

Dr. T. Angus Smith, *vide* A. Macdougall, Esq.

Rudolph Turecki, Esq., states that he has discovered a material which enables him to disinfect excrementitious matters, and to convert them into manure; but he does not state the nature of the materials which he employs.

Mr. Wells is in possession of a method for the treatment of sewerage, but states that it is not chemical, and is communicable only by personal interview.

Sir William Worsley suggests the conveyance of the sewerage to a cesspool in the Greenwich Marshes, thence to flow into the river at the turn of tide. No method of deodorization is suggested.

A glance at these proposals will show at once how few of them address themselves to the special question submitted to us for inquiry. A final plan of disposing of the sewerage having been fixed upon by the board, our investigation was of necessity limited to a comparison of the efficiency of the several deodorizing agents proposed.

After experiments continued for several weeks, we arrived at the conclusions already stated in our report.

In these experiments we had occasion to observe that most of the agents proposed possess the disinfecting power which their inventors have pointed out, and many of them in so marked a manner as to render them undoubtedly valuable for a variety of special purposes. Not one of them, however, in our opinion—with the exception of the agent suggested in the report—possesses that combination of properties which could warrant us in recommending it to the Metropolitan Board of Works for the deodorization of the London sewerage.

THE NEW WATER-WORKS AT OLDHAM.

The people of Oldham have, during the past few years, heard plenty of talk respecting the splendid new water-works now in course of construction at Piethorn Clough. The question has been turned over on all sides, discussed in the council chamber and outside, members of our corporate body have held forth on the merits of the scheme, and gentlemen hoping to arrive at the dignity of town councillors have endeavoured to make capital by denouncing it as the most extravagant piece of business the public of Oldham have ever been called upon to pay for. In fact the subject has been discussed in every variety of tone and temper, from angry remonstrance and prophetic scorn to that of quiet exultation and joyful anticipation. It may perhaps seem somewhat unnecessary for us to occupy the reader's attention with the subject, but we think that there are many people in Oldham who will be interested in an account of the history, extent, and progress of the scheme. We have therefore been to visit the new water-works, and propose to give our readers a sketch of what we saw and heard.

The new water-works scheme was evidently elaborated very carefully before an application was made for the sanction of the Legislature; and every necessary calculation was entered into respecting the wants of the town, the quantity of water which the various streams would furnish to the reservoirs, the cost of the land, the expense of the works, and every other matter requisite for ensuring the complete success of such a gigantic undertaking. This having, at a great expenditure of time, labour, and talent, been gone over, the Act of Parliament was applied for and obtained in June, 1855. The scheme consisted of two parts, distinct from each other. One was the gathering of water from the surface of Besom Hill and the parts adjoining, in order to conduct it to the reservoirs at the old water-works in Strinesdale, by means of a conduit four miles in length. In order to carry out this part of the plan, it was necessary to construct the reservoir at Brushes Clough and Besom Hill, the object of which is to guarantee a specific supply of water to the millowners who had previously been dependant upon the streams rising in that locality. These reservoirs are now complete and the conduit in operation, so that all the water beyond what is necessary to compensate the millowners, is conducted to the Strinesdale reservoirs. This part of the undertaking has cost about £30,000. The estimated cost of the new works at Piethorn Clough, which form the main portion of the new scheme, will of course be far greater than the sum necessary for the completion of the undertaking at Brushes Clough and Besom Hill, and the borrowing powers of the corporation, as fixed by the Act, extend to a further sum of £110,000, making £140,000 in all, an amount which in all probability will suffice for the completion of the work. The time allowed for the construction of the new reservoirs is seven years from the date at which the Act was obtained, so that it extends to June, 1862, by which period it is expected the work will in a great measure be finished, when Oldham will stand in the very front rank as regards a supply of good, pure water for domestic as well as for manufacturing and sanitary purposes.

The locality chosen for the construction of the new water-works is undoubtedly the best that could have been found anywhere in the neighbourhood, and it is a well known fact, that if the Oldham corporation had not had the forethought and enterprise to secure it just at the time they did, the neighbouring town of Rochdale would have snatched the chance away from them. The place is peculiarly well chosen, on many grounds. The water is good, the gathering ground extensive, the supply abundant, and, as Oldham is an elevated town—some portions of it that will have to be supplied by water being nearly 800 feet above the level of the sea—no other place in the neighbourhood would have been suitable to construct water-works of such magnitude as the present and prospective wants of the town require. It is, therefore, very fortunate for us that our corporation have secured Piethorn Clough for the purpose. It is situated in the parish of Rochdale, in the township of Butterworth, and in the hamlet of Bleakedgate-cum-Roughbank, a name rendered in every way appropriate by the wild scenery of the entire neighbourhood.

The cost of the land necessary for the construction of the reservoirs may be stated at about £14,000, most of which was amicably arranged for with the owners, but in one instance was referred to a jury, and in another to arbitration. The portion required from Norman Hill farm for the upper reservoirs was nine acres, and the price, as awarded, was £435, instead of the sum of £2600, at which it was valued by the owners. The other contested case was Skelton's farm, for which £3265 was awarded, the extent of the land being 24¼ acres. The Intake farm was bought very cheap. About 14 acres was wanted, and the corporation would probably have paid £100 per acre, but they bought the whole farm, consisting of 32½ acres, for £1500, and here they have found their most valuable stone, at the top of the hill immediately above the middle reservoir, so that it is only to send down an incline plane of rails which has been constructed for the purpose. The Coldgreave farm, of 68½ acres, was also bought entire, although only 20 acres of it was actually wanted. The whole was bought at only a slight advance on what would have been paid for the 20 acres. It cost £3670. The other land purchased was 7 acres of the Hanging Lees farm; 11¾ acres of the Piethorn farm; 5½ acres of Binns' Pasture farm; 6 acres of Rhodes' Barn farm; 13¼ acres of Mr. Taylor's farm; 4¾ acres of Mr. James Whitehead's farm; Hill's Charity farm, 6 acres; and some other portions of land necessary for the construction of the road and the feeder from Doldrum.

The gathering ground for the new reservoirs is ample. It comprises no less than 1350 acres, of which 1240 acres may be termed the natural gathering ground, the rest—about 110 acres—having been rendered available by the construction of a feeder running along the hill side to the principal reservoir from a place called Doldrum, a name immortalized by Dickens recently in connexion with the charity boy, who wrote as one of the ten commandments the remarkable sentence, or, as the great novelist terms it, "the astounding prohibition," "Thou shalt not commit Doldrum." The gathering ground reaches to the watersheddings which divide the counties of Lancashire and Yorkshire—the highest point being 1500 feet above the level of the sea. There are four reservoirs in the course of construction in the Piethorn valley, and we will suppose that the reader has reached the extreme end of the highest reservoir. He will find himself in a dingle or narrow valley, hemmed in by the hills. Should the reader happen to visit this place, as we did, during the month of July, he may possibly amuse himself by gathering an abundant supply of that pleasant little wild fruit called "wimberries," and also regale himself with the wild raspberries, which are to be found in undisturbed abundance in the neighbourhood. The Piethorn stream, the water of which is remarkably pure, is meandering through the valley, and in the driest seasons is a tolerable stream, while in winter it is of itself sufficient to give a very large amount of water to the reservoirs. The water will ordinarily be admitted into the top reservoir; but when not required, owing to there being a sufficiency of water in the reservoirs already, or when rendered muddy during one of the sudden floods which sometimes occur, it will be conducted along the byewash, which commences above the top water mark, the whole length of the reservoirs to the lowest or compensation reservoir. The top reservoir will at the same time act as a purifier for the main reservoir, from which the supply for the town will be drawn. It will be in fact the residuum lodge, where the water will first be received and then be drawn off into the large reservoir in a pure state. This reservoir is long and narrow, and tapers to a point at the top part where the Piethorn stream enters it. It will be about 740 yards long, and the breadth of the embankment about 240 yards. The embankment will be 320 feet broad at the bottom, and will gradually taper until it will be 30 feet at the top—there being a 3-feet puddle wall in the centre. It will contain upwards of 76,000 cubic yards of earth. The surface area of the reservoir will be eleven acres. The extreme depth of the water in this reservoir will be 60 feet, and will contain 7,000,000 cubic feet of water, so that it is calculated to hold nearly 44,000,000 gallons. The water will be drawn off by means of iron pipes 18 inches in diameter, and before passing into the large reservoir it will pass through another small lodge where the work of purification will be completed. This reservoir will be a very small wreck lodge, and between it and the main reservoir the public highway, which has been diverted from the bed of the middle reservoir, will pass. The road is a portion of the Queen's highway from Rochdale to Huddersfield and Halifax; and judging by its narrow, uneven appearance, we are led to the conclusion that our ancestors were easily satisfied with roads. It looks something like a sheep track, and in many places is as steep as the roof of an ordinary house. The diverted road, with its iron bridge, will certainly be no mean improvement to the Queen's original highway at this point. Where the road passes over the corporation property, the visitor will have a fine view of the large reservoir below, when it is completed and filled with water. It will indeed be a fine sheet. From this place the road will be 14 feet above the highest surface of the water in the large reservoir, which is formed by a high stone wall forming the lower portion of the embankment of the small wreck lodge and the upper boundary of the main sheet of water.

We now come, as we descend the valley, to the operations going on in the formation of the main reservoir, from which the public of Oldham are to be supplied with plenty of water for many generations. It will be 800 yards long and 400 in extreme breadth. It will cover no less than 40 acres of land when full of water, and will then contain no less than 52,720 cubic feet, or 333,000,000 gallons of water. It will be 80 feet deep, and of this 65 feet will be available for the water to be drawn off for use. The embankment will be 1040 feet across from one side to the other, and at the bottom it is 420 feet broad, tapering to the top, where it is to be 32 feet broad. One interesting feature of the scheme is that the top water surface of the large reservoir will be just the same level as the upper reservoir in Strinesdale, so that the water can be run from the Piethorn Water-Works to those in Strinesdale, as both are connected by the same mains: each is 830 feet above the level of the sea. The water will be drawn off through a substantially-constructed stone culvert running under the embankment, the diameter of which is 4 feet; and it contains two iron pipes, one of which is intended to supply the mains for the town, and the other to draw water off into the

compensation-reservoir, which is situated below the main reservoir. The pipes for the former purpose are 20 inches in diameter, and those for the latter 12 inches inside. These pipes are embedded in a solid mass of masonry at the end of the culvert, and the supply-pipe for the town is to be continued up the slope of the embankment, at the top of which there will be the machinery necessary for opening and shutting off the water. At certain distances along the sloping pipe there will be valves, constructed so that the water can be drawn off at different levels, which will ensure a pure supply, as the clearest water will be at the top, and the least valuable portion (which will run into the compensation-reservoir below) at the bottom.

The compensation-reservoir is the lowest of all, and, although not the largest, it will certainly be the prettiest. In the centre part of the embankment there is a natural hill, which will not only add to the beauty of the scene, but also save much expense in the formation of the embankment, provided there are no crevices for the water to escape in it. From this hill embankments are in course of construction to the sides of the reservoir, and are in a forward state already. The embankments will contain 450,636 cubic yards of earth: the surface area of the reservoir will be 12 acres, and it will contain 10,333,535 cubic feet, or nearly 63,000,000 gallons, of water. In order to compensate the millowners for the water taken from them, they will thus receive a regular supply of 219 cubic feet per minute during twelve hours of the day for six days in the week. To ensure the exact supply from the compensation-reservoir, the water will be kept in a cistern at the uniform height of 4 feet by means of a valve and ball-tap, otherwise the water given out would necessarily vary with the pressure from the varying height of water in the reservoir. Economy, as well as a regular supply, will thus be obtained by the simplest means.

The work at present going on consists principally of the formation of the embankments and the culvert. The earth necessary for the embankment is, of course, taken from the interior mainly, so as to deepen the bed and render it more level. Fortunately, there is an abundance of good clay, of which the puddle is made for the middle of the embankment, and it is calculated that about one-third of it is already constructed. It is here that the importance of the locomotive engine and temporary railway is most apparent, as there is a vast amount of material to remove in order to form the embankment. As the work proceeds, this will increase in importance, for the materials will have to be removed from places at a greater distance from the embankment, to which the men are gradually making their way. The work is progressing in a very satisfactory manner at present, and has hitherto been interrupted by no untoward events. Still, these may occur, for in the formation of reservoirs of such magnitude in a mountain district, sudden falls of rain like those which have caused such disastrous floods throughout the country during the last few weeks, may impede the work for some time, and do a serious amount of damage in a very short space. The floods which had taken place a short time before our visit had done but little damage to the works, not more than will be covered by £20 or £30, and when the culverts are completed, there will be no great danger to be apprehended from them. On Sunday last the flood was very great, but comparatively little injury was sustained. The water in the Piethorn stream rose to an unusual height, so that the watercourses from the top to the compensation-reservoir—the upper one of which is 16 feet wide and the lower 20 feet—were 2 feet 6 inches deep in water. The only damage sustained was at the end of the lower watercourse, which is not quite finished, and was partly washed up where it slopes rapidly before entering the compensation-reservoir.

The streams which empty themselves into the new water-works give forth a large supply of water, even in years when the minimum amount of water falls. The principal is the Piethorn stream, which rises on Bleaked-gate moor, at an elevation of 1400 feet above the sea level, and empties itself into the top reservoir, as before stated. Another is the Coldgreave stream, which rises on Foxstone Edge, above the Oldham and Ripponden turnpike road, which it crosses in its course to the main reservoir, where it enters between the Norman Hill farm and the Coldgreave farm. This stream rises at an elevation of nearly 1500 feet. The Hanging Lees stream also falls into the middle reservoir, and rises above the Rooding farm, at an elevation of 1000 feet. The Tom Clough stream rises on Ogden Edge also at an elevation of 1000 feet above the sea level, and falls into the middle reservoir. On the other side of the reservoir there is one stream which rises between Rhodes' Barn and Binns' Barn farms at the same elevation, and another one, known as the Raghole stream, rises near Doldrum, at an elevation of 896 feet. It is conducted by the feeder along the hill side to the middle reservoir. The water supplied by these streams may be known by several tests. A tolerably correct approximation may be arrived at by calculating the average amount of rain which falls during the year, knowing that the whole of the gathering ground amounts to 1340 acres. The average rain is about 40 inches per year, but if we call it 36, the amount in cubic feet will be 135,500,000, or about 1,100,000,000 gallons. Of course all this will not find its way into the reservoirs, or be available for the service of the public. A considerable allowance must be made for absorption and evaporation, although what is absorbed does, no doubt, in a great measure rise as springs on the same gathering ground. By allowing, however, one-sixth to be lost, we obtain for the new reservoirs 920,000,000 gallons during the year, which will be less than the actual amount that would flow into the reservoirs if required. From this amount, reckoning 300 days' supply to the compensation-reservoir, 295,000,000 gallons must be deducted, which will leave 625,000,000 for the use of the town, in addition to what is now available for the Strinesdale reservoirs, including the supply from the new conduit. There are at present about 10,000,000 gallons per week supplied to the town, so that, on the very low computation we have made, there will be a sufficiency for double the amount of our present population. Previous to obtaining the Act the principal streams were gauged, and we may give something of the result. The highest amount registered during some months of the latter part of 1854 and the early part of 1855, was for the combined streams of Piethorn and Coldgreave, on the 14th of December, 1854. There was at that time flowing from those two streams 1412 cubic feet per minute, or 8825 gallons. The minimum rate was on the 12th of September, 1854, when there was only 22 cubic feet, or 137 gallons, per minute. The average is supposed to be about 300 cubic feet, or 1875 gallons, per minute; so that these two streams alone would contribute to the reservoir no less than 985,500,000 gallons per year. With the old gathering ground for Strinesdale, amounting to 660 acres, and that of Besom Hill, amounting to 700 acres, there can be no doubt that this locality will not be likely to suffer much from water for a long time to come. It must, however, be remembered that of the 700 acres of gathering ground at Besom Hill, a very considerable quantity has to be sent forwards for the supply of the millowners. The amount of water at present used in Oldham is 10,000,000 gallons per week, or 520,000,000 per year; and as this has been easily done during the present year, which has been almost unexampled for want of water, our readers will easily see for themselves what the position of the town will be when the new water-works at Piethorn Clough are completed and in operation.—*Oldham Chronicle.*

WOLVERHAMPTON GAS COMPANY.—The Fifteenth Half-Yearly Meeting of the Proprietors in this undertaking was held at the works on Tuesday last—J. Walker, Esq., in the chair. The manager (Mr. Proud) read the report of the directors, which stated that the receipts amounted to £10,862. 2s. 1d., and the expenditure to £6717. 7s. 8d.; the balance, £4144. 14s. 5d., being the half year's profits, enabling the directors to recommend the usual dividend of 5 per cent., amounting to £3558. 8s., payable on and after the 7th of September; the residue, £568. 6s. 5d., to be transferred to the reserve-fund. The increase in the power of the machinery and apparatus, referred to in the last report, would be completed in time to meet the increased manufacture of gas. The directors had been called on by the town authorities to greatly extend the lighting district, and the request was promptly responded to by the directors laying down main pipes wherever lamps were ordered. The consequent expense was very heavy in proportion to the revenue to be derived, and would probably be unremunerative for some time to come, there being scarcely any but the public lighting of lamps on the respective roads. The directors felt, however, that whilst complying with the wishes of the authorities, they were at the same time conferring an advantage on the public, and cementing the good feeling which it had always been the pleasure of the directors to cultivate. The report was adopted on the motion of the chairman, and resolutions ordering the payment of a dividend at the rate of 5 per cent. for the half year, and thanking the directors for their past services, were unanimously agreed to. In acknowledging the compliment paid to his brother directors and himself, the chairman said he could say with sincerity that it was utterly impossible they could be more attentive to their own private business than they were to the interests of the company.

Price Current.

CASTINGS, PER TON.

Average Weight of Cast-Iron Gas-Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 15 0	2 14 6	3 5 0	3 5 0	3 10 0
1¼ and 2 inches Socket-Pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3 „ „	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
4 and 5 „ „	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 in. and upwards „	5 15 0	4 15 0	5 0 0	5 5 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
„ 2nd „ cold „	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank Plates, ¼ thick and above	6 0 0	5 0 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 ft., perft.	1 8	1 0	0 10	0 7	0 5	0 4½
„ „ „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-Pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows—wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
„ with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets [Nipples	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	—

COALS, PER TON.

Newcastle.—Unscreened.		*Scotch Cannel.*	
Whitwell Primrose	6s. 3d.	Boghead, at Leith	45s. 0d.
Medomsley, Eighton Moor, and Burnhope	6 6	Kirkness, best	23 0
Pelaw	6 9	Capeldrae, 1st quality	20 0
New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth	7 0	„ 2nd „	12 6
Pelton	7 9	Lesmahago, at Glasgow	25 0
Ramsay's Newcastle Cannel	16 0	„ „ Leith	27 6
		Arniston	22 0
		Wemyss	20 0
		Knightswood	18 0
		Pirnie	15 0

SUNDRIES.

Best Newcastle Fire-bricks	per 1000	50s. 0d.
Cliff's Fire-bricks, at Wortley	per 1000	57 6
Ingham's Fire-bricks, at Wortley	„	55 0
Fire-clay Retorts	per foot run, 5s. 6d. to	7 0
Tough Cake Copper ... per ton	£107 10s.	
English Pig Lead ... „	22 0	
Welch Bar Iron, in London „	6 17 6	
Tarred Rope Yarn	per cwt.	26s. 0d.
Foreign Spelter ... per ton	£21 0 0	
English Block Tin ... „	136 0 0	
Banca ... „	144 0 0	

FREIGHTS.

Coastwise—Newcastle.—Per Ton.		*Foreign.—Per Keel.*	
Chatham & Rochester, 5s. 7½d. to	6s. 0d.	Boulogne and Calais	£7 15 0
Cork	9 0	Barcelona	£23 to 24 0 0
Dover	6 4	Bordeaux	15 10 0
Dublin	9 6	Cadiz	15 0 0
Exeter Quay	8 0	Copenhagen	8 15 0
Folkestone	6 6	Dieppe	8 5 0
London (Wharf)	6 0	Genoa	22 0 0
Lowestoft & Yarmouth, 4s. 3d. to	4 6	Hamburg	7 15 0
Lynn	—	Havre	9 0 0
Portsmouth	7 3	Leghorn	22 0 0
Plymouth	7 9	Lisbon	16 0 0
Ramsgate	8 3	Rotterdam	7 10 0
Whitstable	—	Stettin	10 0 0
Weymouth	7 0	Trieste & Venice	£24 to 26 0 0

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*** Country orders executed with care and despatch.

LESMAHAGO GAS COAL.

JAMES FERGUSON and CO., Lessees of the Auchinheath and Craignethan Gas Coal-fields (the most extensive and valuable in the parish of Lesmahago), respectfully intimate to the Managers of Gas-Works and Consumers of Gas Coal, that they are prepared to ship the best quality of the above well-known COALS at Glasgow or Leith; and also to deliver them at the railway stations upon, or connected with, the Caledonian Railway, to any extent which may be required.

Price, free on board, or delivered at the railway stations, may be learned by addressing James Ferguson and Co., Gas-Coal Works, Lesmahago.

Shipping Agent for Glasgow:
MR. ALEXANDER STRATTON,
159, WEST GEORGE STREET.

CAUTION.

TO GAS-METER MANUFACTURERS AND OTHERS.

THE Undersigned hereby caution Meter Manufacturers and others against infringing the exclusive right of the Undersigned to the use of the Screw Adjustment for regulating the Height of the Overflow-Pipes in Wet Gas-Meters, as described in the Specification of the Letters Patent granted to Crosley and Goldsmith on the 19th of April, 1856; as well as against infringing any other portions of that or any other Patent of the said William Crosley; and

NOTICE is further given, that all Infringers of the said Inventions, or any portions of them, will be proceeded against.

CROSLEY & CO.,
103, SOUTHWARK BRIDGE ROAD,
LONDON, Aug. 29, 1859.

FIRE BRICKS.

THE MACHEN COLLIERY COMPANY, NEWPORT (MON.).

Shippers of Fire-Goods of First-class quality manufactured from a remarkably pure seam of Fire-Clay.

Railway Communication by Broad or Narrow Gauge with all parts of the Kingdom, and by Seaboard, Coastwise, and Foreign.

GEORGE ANDERSON, Gas and CONSULTING ENGINEER, 104, LEADENHALL STREET, LONDON (E.C.).

DIRECT-ACTING GAS-EXHAUSTERS, supplied either with or without Steam-Engines and Boilers.

FOUR-WAY DIAPHRAGM VALVES, one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

RETORT SETTINGS, designed to be heated by Tar alone, and with a tota absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

TO GAS & WATER COMPANIES, ENGINEERS AND FITTERS.

GARSIDE'S Registered Tube-Vice holds all sizes of Wrought-Iron and Brass Tubes with the greatest firmness and least possible pressure; consequently it is not so liable to split or damage the Tubes as the ordinary Vice, and considerably facilitates the Workman, who may do almost double the quantity of work. Also,

GARSIDE'S IMPROVED MAIN-DRILLING CLIPS, for Drilling Holes for Service-Pipes. With this instrument the perforation of Pipes for the attachment of smaller Tubes can be effected with great ease and precision. Likewise,

HEAP'S REGISTERED GAS TONGS, most highly approved of as vastly superior to those in present use. Stocks, Taps, and Dies, together with all tools connected with Gas Engineering.

For Drawings, Testimonials, and prices, apply to the Maker, S. GARSIDE, Stamford St., ASHTON-UNDER-LYNE.

KINSON FIRE BRICKS are indestructible by heat, and are warranted to last twice as long as Stourbridge, Newcastle, or Welsh bricks. 80s. per 1000 at Nine Elms Station.

WORKS: POOLE, DORSET.

WALTER MABON, Engineer, ARDWICK IRON WORKS, FAIRFIELD STREET MANCHESTER,

Manufacturer of

IRON TANKS for Gasholders, Railway Stations, &c.

GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.

GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.

WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.

IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.

PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

CANNEL and COAL of the best descriptions for making GAS and COKE.

(As per Analyses.)

GAS CANNEL, 17s., 15s. 6d., and 14s. per ton.
GAS COAL, 11s. 6d., 9s. 6d., and 8s. 6d. per ton.
STEAM COAL, 10s., 9s. 6d., and 9s. per ton.
All free on board Vessels in Liverpool.

Handpicked Cannel and Coal about 10 per cent. additional. Concession in prices made for large quantities.

GAS APPARATUS of all descriptions, and on the most approved principles; also Purifying and other materials supplied.

ANALYSES, PLANS, and ESTIMATES, and other information required, and the highest references furnished on application.

CONTRACTS for Materials and Works entered into.

No charge made for Superintending Shipments, Preparing Bills of Lading, or passing Entries.

EMANUEL TURNER and CO.,
EXPORT OFFICES:
34, CASTLE STREET, LIVERPOOL.

WEST and GREGSON, Gas-Meter MANUFACTURERS, &c.
UNION STREET, OLDHAM.

Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

ROBERT MACLAREN and CO., EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

JOHN ROGERSON and CO., NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.
Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

SOUTH METROPOLITAN GAS-LIGHT AND COKE COMPANY.

NOTICE is hereby given, that an ORDINARY MEETING of the PROPRIETORS of this Company will be held at the London Tavern, in the City of London, on WEDNESDAY, the 5th day of October next, at Two o'clock precisely, to receive the Directors' Report and the Accounts of the Company for the half-year ended June 30th last; and to declare a Dividend for the same period.

By order of the Directors,
THOMAS LIVESEY, Secretary.
Old Kent Road, Sept. 13, 1859.

GRANT AND CO.'S
PATENT COMPENSATING GAS-METER,

Which secures accuracy of registration by its maintaining a true water-line under every circumstance, by a simple contrivance which is not liable to get out of repair; requiring little attention, they being self-acting—as the water is again used that is left, after supplying what has been lost by evaporation.

GAS-METER WORKS: EDINBURGH.

JAMES MEACOCK,

PATENT DRY AND IMPROVED WET GAS-METER MANUFACTORY,

7, SNOW HILL, AND 16, WEST STREET, LONDON.

ESTABLISHED 1836.

JAMES MEACOCK begs to thank Gas Companies and the Trade generally for the very liberal support awarded him in his Patent Dry Gas-Meter; his Improvement in connecting the Diaphragm between Metal Rings, cemented and screwed to the Tin Frames, being pronounced by Gas Engineers to be the most perfect improvement to the Dry Meter since its introduction.

J. M. also invites attention to his improved

EXPERIMENTAL WET GAS-METER,

which, from its construction,

renders **LEAKAGE FROM THE STUFFING-BOX** an impossibility.

These METERS are GUARANTEED to meet all the REQUIREMENTS of the SALE OF GAS ACT.

GOVERNORS, STATION-METERS. PHOTOMETERS,
EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,
AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

LORD REDESDALE'S SALE OF GAS ACT.
WET AND DRY GAS-METER WORKS,
GREAT PETER STREET, WESTMINSTER.

THOMAS EDGE has the satisfaction to inform those Directors of Gas Companies who have favoured him with their Orders for his Patent Improved Wet Meters—of which he has sent out upwards of 80,000—that they will not require any alteration under the provisions of the Sale of Gas Bill; whereas the Common Meters in use in the United Kingdom which have been proved so susceptible of error in their measurement are required to be taken down and altered at considerable expense.

Thomas Edge begs to state that he is prepared to supply his Patent Meters, which meet the requirements of the Act, to any Company at the present time; and, so soon as arrangements are made in London to have Meters tested and stamped, he will then supply them to Country Gas Companies with the Legal Stamp affixed, ready for use.

ALEXANDER WRIGHT,

GAS ENGINEER, MANUFACTURER OF GAS-METERS, GOVERNORS, AND EVERY DESCRIPTION OF GAS APPARATUS,

55, MILLBANK STREET, WESTMINSTER.

CONSUMERS' METERS at the List Price, with a Liberal Discount to Wholesale Purchasers.

THOMPSON'S BROMINE TEST, £1. 1s.—BROMINE, 3s. per Ounce.

BISULPHURET OF CARBON TEST, £2. 2s.

APPARATUS FOR DETERMINING THE HEATING POWER OF SAMPLES OF COAL AND OTHER DESCRIPTIONS OF FUEL, £5. 5s.,

INVENTED BY LEWIS THOMPSON, Esq., M.R.C.S.

REGISTERING PRESSURE GAUGE, Net Price, £8. Glass Shade, 10s. extra.

STATION METERS, PRESSURE GAUGES, PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, &c.

LORD REDESDALE'S "SALE OF GAS BILL" having received the sanction of the Legislature, Gas Companies and Consumers are respectfully informed that ALL Meters made at this Establishment will be constructed most carefully to meet the requirements of this Act.

WRIGHT'S COMPENSATING METER possesses peculiar claims on the attention of those who desire to obtain a most simple and thoroughly efficient instrument at a moderate price.

FIRE-CLAY RETORTS.

JOHN SWARBRICK,

MANUFACTURER OF PATENT COMPOSITION CLAY RETORTS,

FIRE BRICKS OF EVERY DESCRIPTION, SHAPE, AND SIZE, &c. &c.

HIGHER EANAM, BLACKBURN, LANCASHIRE.

These RETORTS are generally used in the Gas-works of Preston, Accrington, Bury, Heywood, Middleton, Rochdale, Ratcliffe; the Mills of Messrs. Horrocks, Miller, and Co., Preston, &c. &c., and are unequalled in having afforded general satisfaction to those who have given these Retorts a trial.

To meet the increasing demand, the Works at Little Harwood have been greatly enlarged; and Gas Engineers who may favour with an Order may rely with confidence on their being promptly supplied with an article not to be surpassed in finish or durability.

PRICES MODERATE.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

EDWARD COCKEY & SONS'

PATENT GAS VALVES.

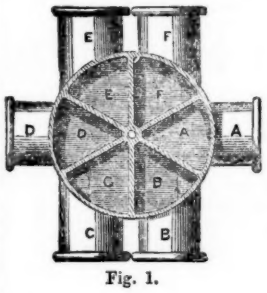


Fig. 1.

THESE Valves are formed of two cast-iron cylinders, with segmental divisions, having faces ground gas-tight, the upper cylinder turning horizontally on the lower one.

The lower cylinder has pipes from each division communicating with the vessels to and from which gas is to be passed. The upper cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and when it is turned on the face of the lower one to alter the flow of gas from one vessel to another.

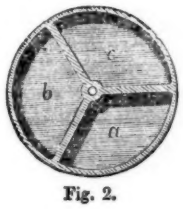


Fig. 2.

Fig. 1 shows the Valve prepared for two purifiers, in which, by turning the upper cylinder, Fig. 2, the Gas is directed to either purifier separately.

Another arrangement is just completed for two purifiers, by which the Gas may be directed through both purifiers together, entering either first, or through either purifier separately. The advantages of this arrangement will be too manifest to Gas Manufacturers to need comment.

The Valves are manufactured by the Patentees at their

IRON WORKS, FROME SELWOOD.

The following Testimonial has been received from an eminent Engineer:—

Gaslight and Coke Company's Office, Cheltenham, Jan. 17, 1859.

Messrs. Cockey and Sons, Frome.

Gentlemen,—The Patent Purifier Centre Valve which I had fixed instead of the common hydraulic valve for one of our sets of purifiers with 9-inch connexions, I am happy to say continues to afford satisfaction both to myself and to the workmen who have the charge of it.

I am, Gentlemen, yours truly, W. ESSON.

EDWARD COCKEY AND SONS

ALSO MANUFACTURE

PURIFIERS, SCRUBBERS, CONDENSERS, AND OTHER IMPROVED GAS APPARATUS,

HAVING PATTERNS SUITABLE FOR GAS-WORKS OF DIFFERENT SIZES.

WILLIAM PARKINSON AND CO.,

(SUCCESSORS TO THE LATE SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.,

PATENTEES AND MANUFACTURERS OF

GAS-METERS, GOVERNORS, AND OTHER APPARATUS;

ALSO,

METERS FOR MEASURING WATER, &c., &c.

IMPROVED LOW-SPOUTED GAS-METERS,

Which completely meet the requirements of Lord Redesdale's Sale of Gas Act, and are as simple in their construction, satisfactory in working, and as low in price as the well-known Meters which have been made by W. P. and Co., and their predecessor, Mr. Samuel Crosley, during the last forty years, and of which there are about 300,000 now in use.

STATION-METERS AND GOVERNORS

Of all Sizes, of the best Construction, Materials, and Workmanship, supplied on the shortest notice.

There are about 300 Station-Meters at work of their manufacture, of sizes varying from 750 to 60,000 cubic feet per hour, of which the following are some of the principal ones, recently supplied by them to London Gas Companies, viz. :—

2	for	60,000	cubic feet per hour each	to the Chartered Gaslight and Coke Company, Westminster;
1	„	40,000	„ „	Chartered Gaslight and Coke Company, Brick Lane;
2	„	60,000	„ „	London Gaslight Company, Vauxhall;
1	„	60,000	„ „	Commercial Gas Company, Stepney;
1	„	40,000	„ „	Equitable Gas Company, Pimlico;
1	„	40,000	„ „	Phœnix Gaslight Company, Greenwich,

&c. &c. &c.

And they have also supplied large Station-Meters to the Gas Companies at Birmingham, Nottingham, Sheffield, Southampton, Leeds, Newport, Glasgow, Manchester, Dublin, Cork, and all the principal towns in the United Kingdom, as well as many on the Continent, &c., &c.

Their Station Gas-Governors have been adopted by most of the above-named Companies, and have given universal satisfaction.

PRESSURE REGISTERS, EXPERIMENTAL METERS, PHOTOMETERS,

Minute Clocks, Consumers' Gas-Governors, Pressure-Gauges,

STANDARD EXPERIMENTAL GASHOLDERS FOR PROVING METERS, &c.

GEORGE LOWE'S PATENT NAPHTHA BOXES AND MOTIVE-POWER METERS,

WITH MACHINERY FOR WEIGHTS TO ASSIST THE SUPPLY OF GAS WHERE THE PRESSURE IS LOW.

SPECIFIC GRAVITY APPARATUS, RAIN GUAGES, &c.

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

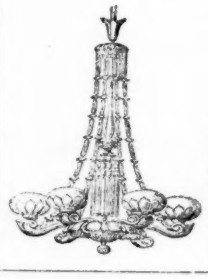
WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

C. H. is prepared to carry out the warming and ventilation of public buildings, &c.; also civil engineering in general.



F. & C. OSLER,

45, OXFORD STREET, LONDON;

Manufactory—Broad Street, Birmingham—Established 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

BOULTON'S PATENT

DRY GAS-METERS,

Of which upwards of 24,000 are at present in use, having gained for themselves an unparalleled patronage from all the principal Gas Companies and Consumers, on account of their unerring registration and the superior workmanship and materials used in their construction, enables the Patentee to sell them now at competitive prices with those of other makers.

Every description of Improved Wet or Patent Dry Meters and Gas Apparatus manufactured by

JOSEPH BOULTON,

28, BAGNIGGE WELLS ROAD, CLERKENWELL.

THE UNIVERSAL

GAS-BURNERS REGULATOR,

(GEYELIN'S PATENT,)

The only one in the world by which the flame from Argand, Fish-tail, and all other Burners remain invariable under all variations of pressure, and the cost of each light is less than one farthing per hour.

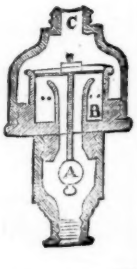
Can be fixed horizontal, close to, or distant from, the Burner; is ornamental, simple in construction, consisting of a double chamber, the inner perforated, covered with a diaphragm giving action to a spherical valve.

PRICE 3s. EACH.

Can at all times be seen tested at the Manufacturer's,

JOSEPH BOULTON,

28, BAGNIGGE WELLS ROAD.



FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

For EXPORT from the Ports of { LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

M. B. NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.

PADDON and FORD respectfully invite the attention of Gas Companies and Managers to their PATENT STREET LAMP REGULATOR, which ensures any required consumption.

By its use a great saving is effected, and the item of "Unaccounted-for Gas" considerably decreased.

PADDON and FORD, Patent GAS-METER AND APPARATUS WORKS, GRAY'S-INN-ROAD, LONDON,

Manufacturers of WET and DRY GAS METERS, STATION METERS, GOVERNORS, EXPERIMENTAL APPARATUS, LANTERNS, &c. &c.

Contractors for the erection or alteration of Gas-Works; and every description of Apparatus required in Gas-Works supplied.

GEORGE CUTLER, Gasholder MAKER,

No. 8, WENLOCK-ROAD, CITY-ROAD, LONDON.

Contracts for Tanks, Gasholders, Roofs, Purifiers, and all descriptions of Gas Apparatus executed on the most reasonable terms. Improved Slide Valves, Steam, and Range Boilers, and Smiths' Work, of the best materials and workmanship.

"ALL DOUBTS REMOVED."

DEFRIES' celebrated Dry Gas-METERS, of which there are 80,000 in use in Palaces, Churches, Chapels, Royal Dock-yards, Club Houses, Public Offices, and other buildings throughout the Empire, the Continent, and Colonies.

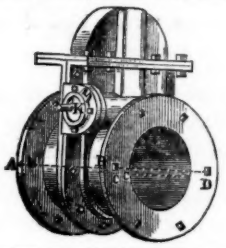
His meter for 1500 lights, in use upwards of ten years at the Royal Italian Opera, until that building was destroyed by fire, was long afterwards dug out of the burnt ruins, then tested by the Chartered Gas Company and found inflexibly correct.

On the 9th of June, 1858, at the Western Gas Company, his meter for 150 lights, after considerable use, was doubted, and subjected to the most variable tests, from the full lighting down to a single jet, and in each case, as in numerous other instances, accuracy was finely indicated.

His two large meters at the Thames Tunnel have been in constant use day and night for upwards of twelve years (one continuation of dark hours), subjected to the wear and tear of 75 years, as compared with the ordinary hours of using gaslight above ground.

Gas Companies honouring Mr. Defries with their commands for his PATENT DRY METER, which has done so much service in simplifying the fitting up of gas, as well as checking surreptitious burning, will be guaranteed perfection for five years free of charge.

Defries' Prize-Medal Gas Baths, Gas-Cooking and Heating Stoves. The Polytechnic Gas Fire, with indestructible fuel, in daily operation (Saturday excepted) at the Office, 406, Euston Road, Fitzroy Square, LONDON.



BRYAN DONKIN & CO.

keep always on stock their

IMPROVED GAS VALVES

from 2 inches to 18 inches, price 11s. 6d. to 13s. 6d. per inch diameter

List of prices, with full dimensions of all sizes up to 27 inches, to be had on application.

These Valves are all proved to 30 lbs. on the square inch before leaving the works.

BRYAN DONKIN & CO.,

ENGINEERS,

NEAR GRANGE ROAD, BERMONDSEY.

BIRTLEY IRON WORKS, CHESTER-LE-STREET, DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

HARRIS and PEARSON

PROPRIETORS OF

BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.

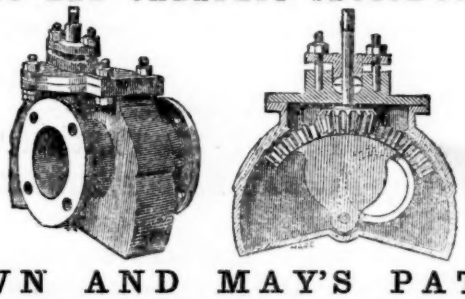
MANUFACTURERS OF

FIRE BRICKS GAS RETORTS &C.

AMBLECOTE FIRE CLAY AND BRICK WORKS, STOURBRIDGE.

Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.

BEST AND CHEAPEST SLUICE-COCK.



BROWN AND MAY'S PATENT.

Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

Can be taken to pieces without being removed from the line of Piping.

NORTH WILTS FOUNDRY, DEVIZES.

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C., Where a Sample may be seen.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

London Agents: CHADWICK and AKEROYD, Willington Stone Wharf, Regent's Park Basin.

A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

LORD REDESDALE'S SALE OF GAS ACT.

WILLIAM SUGG

Begs to inform Gas Companies and his Customers generally that henceforth all Meters sent out from his Works, both Water and Dry, will meet the requirements of the above Act.

To those Gas Companies who desire a Self-Adjusting Meter, he recommends his "COMPENSATING WATER METER" as a simple and efficient instrument, combining accuracy of registration with protection against fraud, while the slight difference in form between it and the ordinary Water Meter renders the alteration of existing stock a matter of comparative ease and moderate expense.

Those who approve of the non-compensating Meters will find his "WATER-BOX METER" all that can be desired.

GAS-METER and APPARATUS WORKS: 19 and 20, MARSHAM STREET, WESTMINSTER.

SALE OF GAS ACT.

MESSRS. CROLL, RAIT, AND CO.,

Manufacturers of Croll's Patent Improved

DRY GAS-METER,

being informed that several Gas Companies are under the impression that Dry Meters will not be allowed by the above Act, beg to say that such is not the case, inasmuch as the Act embraces "every kind of machine used for measuring gas," and provides for the testing of the same, in its 13th clause.

Speaking for themselves, and of the Meters manufactured by them, C., R., and Co. have the gratification of knowing that not one single Meter out of the large number they have sold, will, when tested by an Inspector, be rejected; and, consequently, that neither Gas Companies nor Consumers who have these Meters in use will be put to one farthing expense for alterations.

C., R., and Co. always adopted the unit of measure provided for by the 2nd clause of the Act, and have never allowed themselves a greater latitude than 1 per cent. either fast or slow, and they intend to adhere to these limits, notwithstanding that the Act allows 2 per cent. fast and 3 per cent. slow.

C., R., and Co.'s Meters register most correctly all the gas passed through them, whether it be the smallest quantity or the full complement for which the Meters are made; and *they are prepared to give written guarantees to Purchasers that the Meters shall, when tested by an Inspector on his appointment under the Act, be approved of by him as correct. In the event of such not being the case, the Purchaser to be entitled to return the Meters to C., R., and Co., and claim from them their cost, together with any expenses incurred by their rejection.*

Further, C., R., and Co. undertake, during a period of five years from the date of purchase, to put into good order, free of charge to the Purchaser, any Meters of their manufacture which may become defective.

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of the Capacity required by the 2nd Clause of the Act,

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